November 17, 1947

STEEL

The Magazine of Metalworking and Metalproducing

TECHNOLOGY DEPARTMENT

ESTABLISHED 1882

EDITORIAL INDEX PAGE 35

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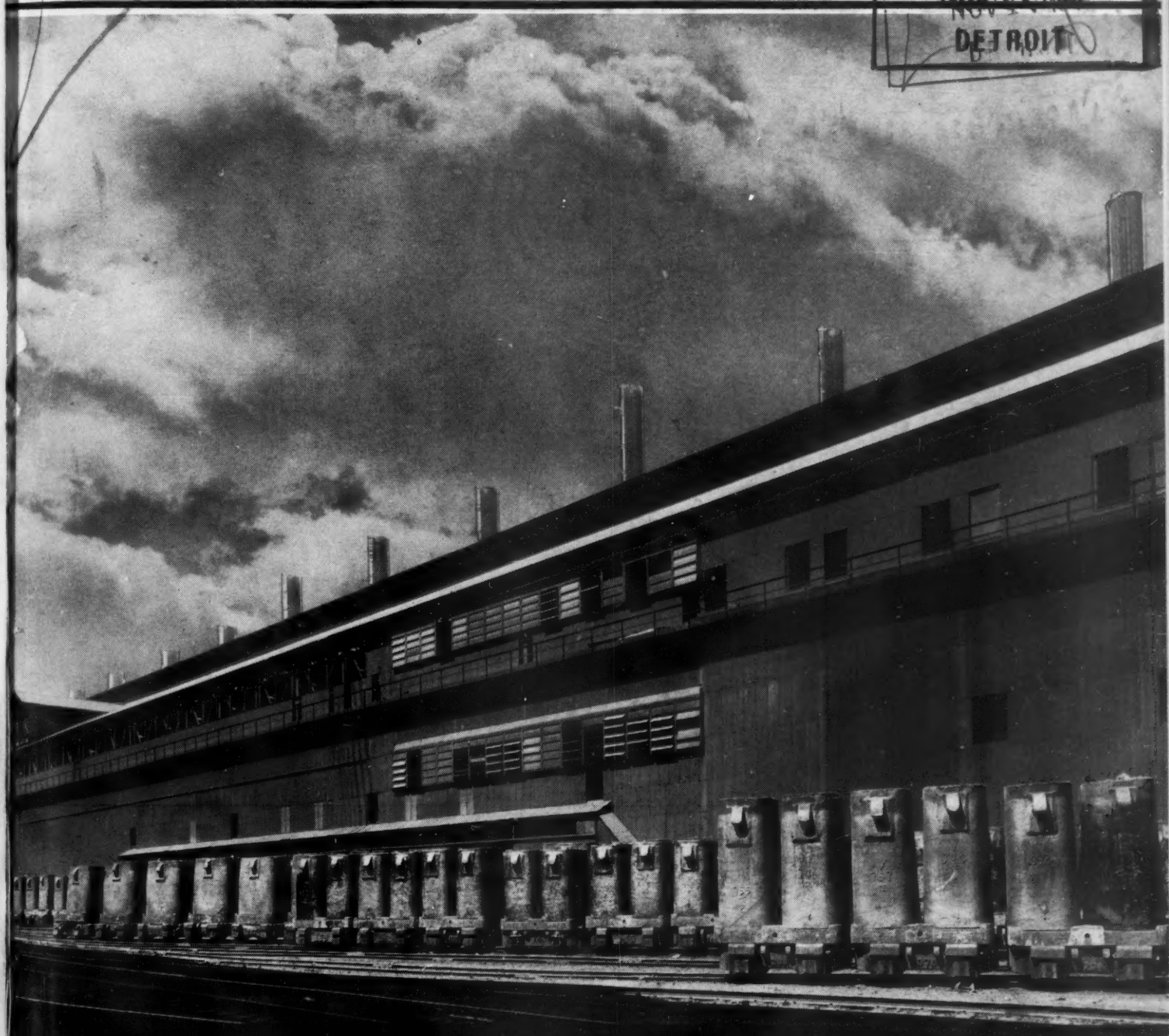

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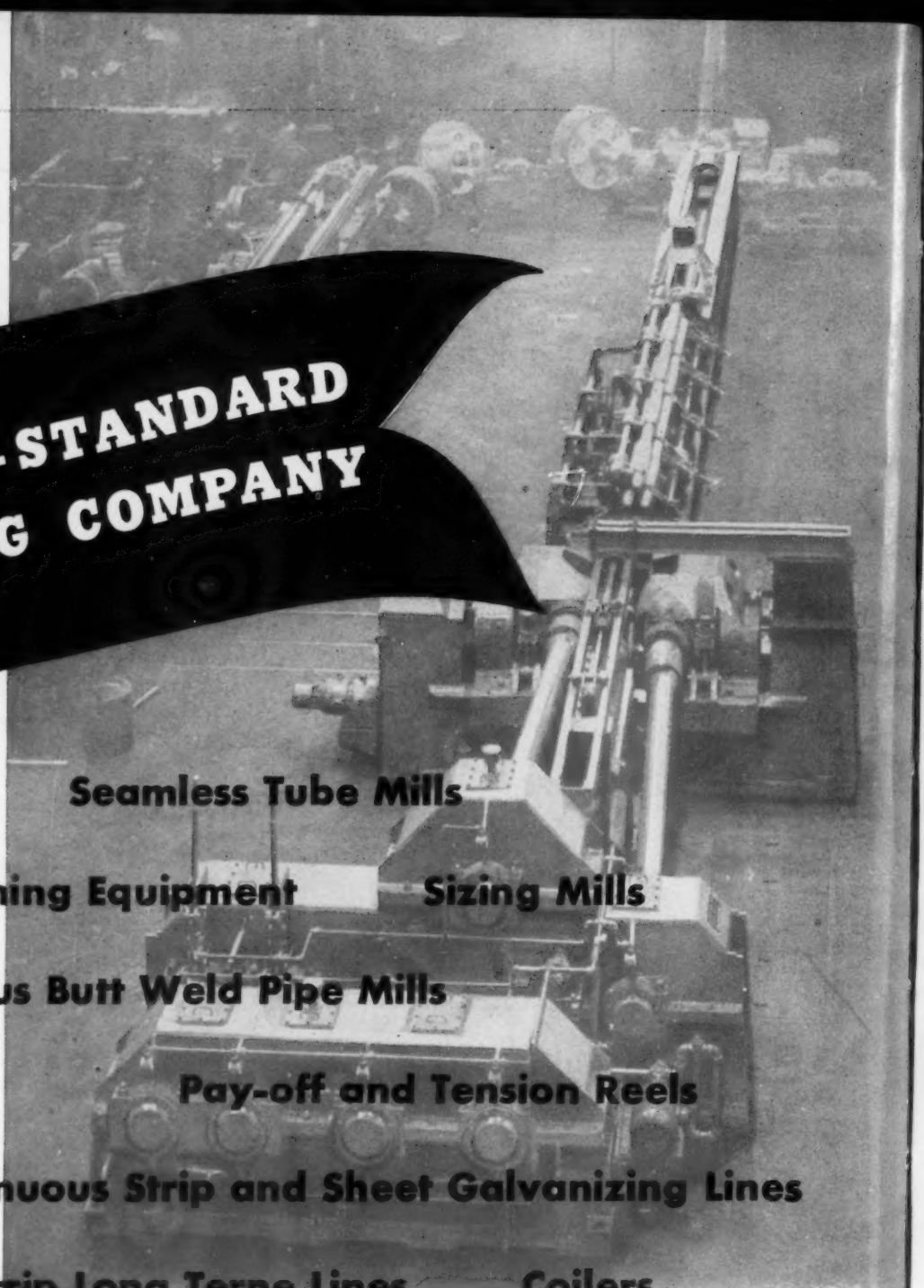

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Bethlehem manufactures the full line of AISI alloy steels used by the hand-tool and allied industries. From start to finish the uniformity of these steels is rigidly controlled. Close metallurgical supervision and careful furnace practice assure the high quality needed for the most exacting uses.

Full information on alloy steels, their treatment, and their application to your product will be supplied by Bethlehem metallurgists. Write us in detail.

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Designed for rapid yard work, the Aero-Crane goes anywhere a truck can go. You can travel it light or loaded with boom in any position. Tough-built, with anti-friction bearings throughout, electric welded construction, non-burn clutches, Air-controls, Aero-Crane keeps going free of breakdowns—pays for itself in saved man-hours.

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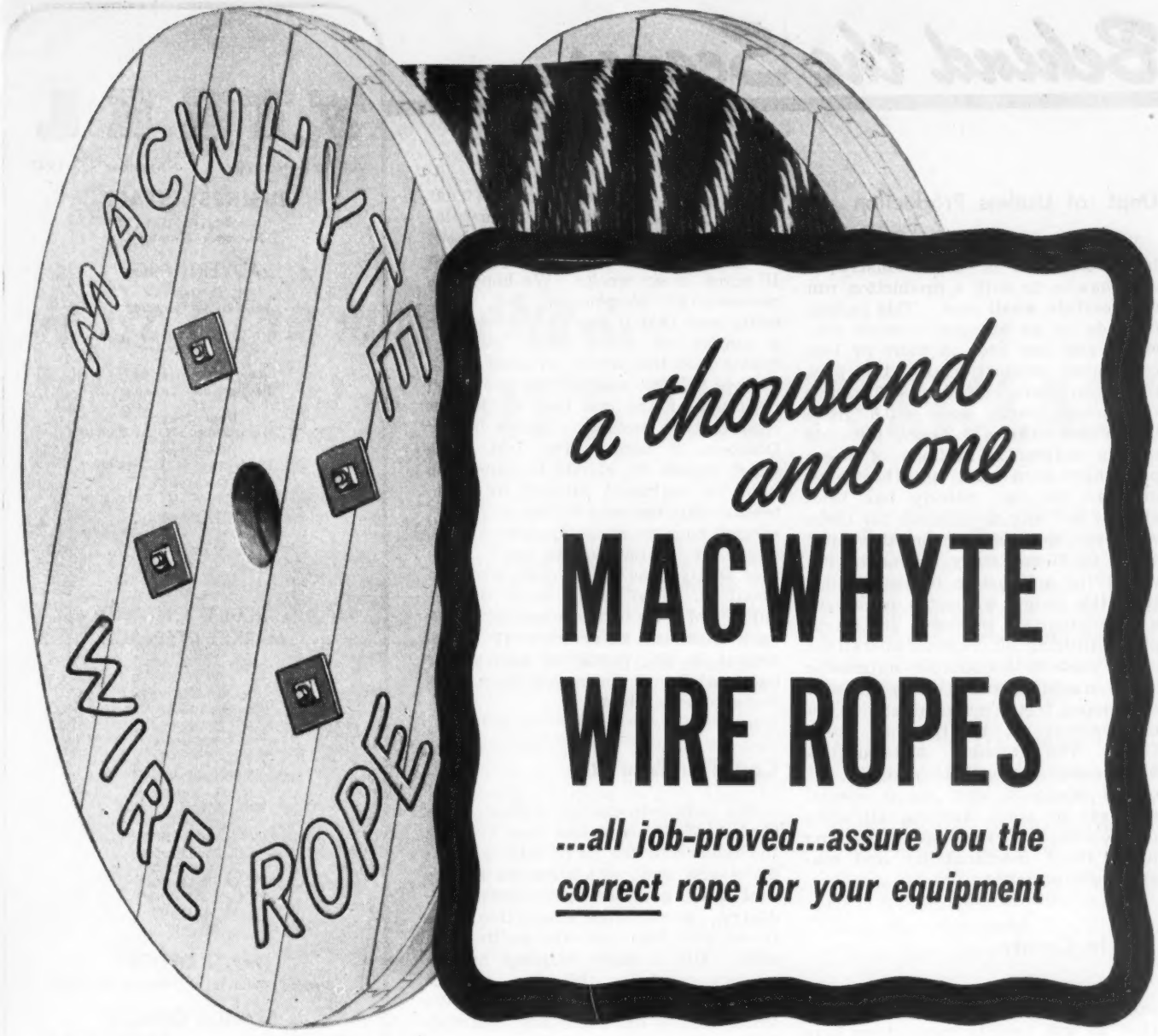

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Behind the Scenes...

Dept. of Useless Production

We think one of the most interesting little tales of this industry of ours has to do with a production run on a certain small part. This gadget is made on an automatic screw machine, and has been in more or less continuous production for the past seventeen years. Of course there are many such parts, some with much longer runs than 17 years, but this one is different. Millions of these parts have been made, and they're all useless. So far, nobody has been able to find any application for them whatever. Sounds like something out of an O. Henry story, or maybe it's worthy of a Thurber, but in reality, this little gadget without a use serves a very important purpose. It's a test piece, utilizing all common operations of a modern six-spindle automatic screw machine, and it's the basis of continuous tests on machinability being carried on by Republic Steel Corp. The Republic metallurgists have made these little gadgets out of all standard and many special analyses of steel, keeping all sorts of records, with the aim of learning more about machinability and machine performance.

Puzzle Corner

We've had so many questions and protests on the cow-and-grass puzzle that we will have to break down here and now and devote a little space to the solution given and the method used. The problem, you'll recall, was published here Sept. 15, and said that six cows eat all the grass on ten acres in 16 weeks or 18 cows in eight weeks. How many cows eat all the grass on 40 acres in six weeks, the grass growing all the time. The answer was given here Sept. 29 as 88 cows, and here's how we did it: First of all, six cows can eat all the growing grass on ten acres, and in addition in sixteen weeks eat the accumulated grass. Therefore, 24 cows can eat the growing grass on 40 acres and in addition, eat the accumulated grass in 16 weeks. Our problem then becomes one of finding out how many additional cows are needed to finish all the grass off in six weeks. We'll let the 24 cows eat the growing grass. Then, if six cows eat 10 acres in six weeks, 24 cows eat 40 acres in 16 weeks or 48 cows eat 40 acres in 8 weeks or 64 cows eat 40 acres in 6 weeks. Remember, they're eating only the grown grass—we already have 24 eating the growing grass. That means our two groups of cows total 88, the number required to eat both the grown and the growing grass on 40 acres in six weeks. We hope this removes all skepticism, but we're fairly sure that it won't. And now to a couple of other little matters. Seems that the printer crossed us up and we weren't reading the proof too carefully on the last part of the answer to that problem of nines in our October 13 issue. The last part, which equals 20, should be nine plus nine, or eighteen, divided by nine-tenths—but the way it was set up, it seemed to read nine plus nine-ninths, which of course equals ten. Hope that straightens out all who wrote in about it. And while we're on the subject of puzzles and cleaning up all back business, there were 47 trains passed in the puzzle of two weeks back, while we journeyed from Perterba to Polatchka.

Can You Bear It?

Our editor-in-charge-of-New England, L. E. Browne, has been burning the roads and the oil of late, preparing a new opus which has an important bearing on the metalworking industry. In fact, the whole thing has to do with bearings—the antifriction kind. It's a basic roundup on the subject, covering all the various types and their applications. We think this is an important contribution to the knowledge of many of you readers who need to know about this highly technical subject but who can't afford to spend as much time digging into the sources of information as Brownie has. Starts in this issue, so don't miss it.

In Re: Inflation

After reading about that first postwar display of Rolls Royce cars in New York a couple of weeks back, we think we'll rush right out and help send a few more dollars exchange to Britain. What's $20,000, more or less, for a car? And in the same breath, we'll mutter that those new Scottish tweeds are real nice, too, at $165 per suit. Won't we look real nice, driving away from the sheriff in our Rolls and wearing our new tweeds?

Shrdlu

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STEEL

Vol. 121—No. 20 November 17, 1947

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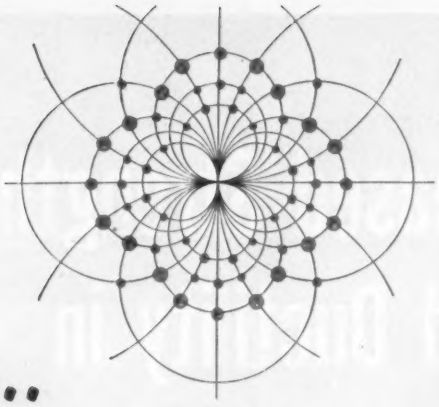


It isn't the magnesia...

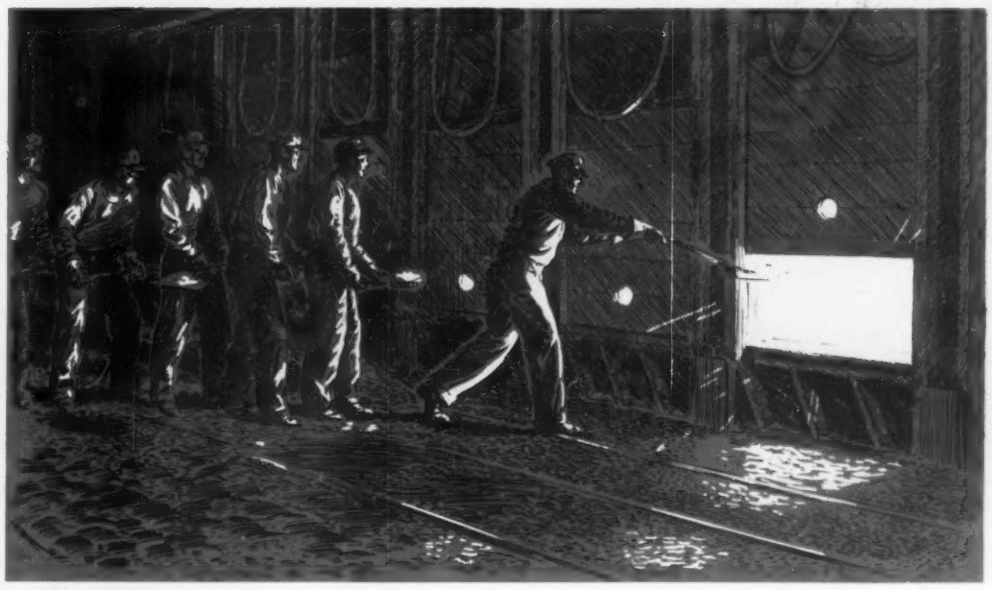
..IT'S THE PERICLASE

MAGNESIA has long been considered as the most valuable component of a hearth refractory. Actually it is not magnesia by chemical analysis, but periclase, the crystalline form of magnesia, which provides the high resistance to erosion that steelmakers require.

Conventional grain magnesites have a high magnesia content, but require the addition of large amounts of open hearth slag to permit sintering. Installation is slow, laborious and expensive. Periclase content of the completed hearth is diluted by the large, unevenly distributed slag additions.

Basifrit, the original "quick setting" magnesite, eliminates these deficiencies. Its composition includes a refractory calcium silicate bond and a coalescing agent, calcium ferrite. Calcium silicate is compatible with the usual lime-rich slags encountered in the basic steelmaking process, and calcium ferrite, formed in Basifrit during manufacture, permits the refractory to set rapidly at normal furnace operating temperatures.

As a result of these designed properties, a Basifrit hearth takes but half the time required to install a conventional magnesite-and-slag hearth. All the magnesia in Basifrit is in the form of periclase, the key factor responsible for the excellent performance of Basifrit hearths, scores of which are still in use after 15 to 20 years of service.



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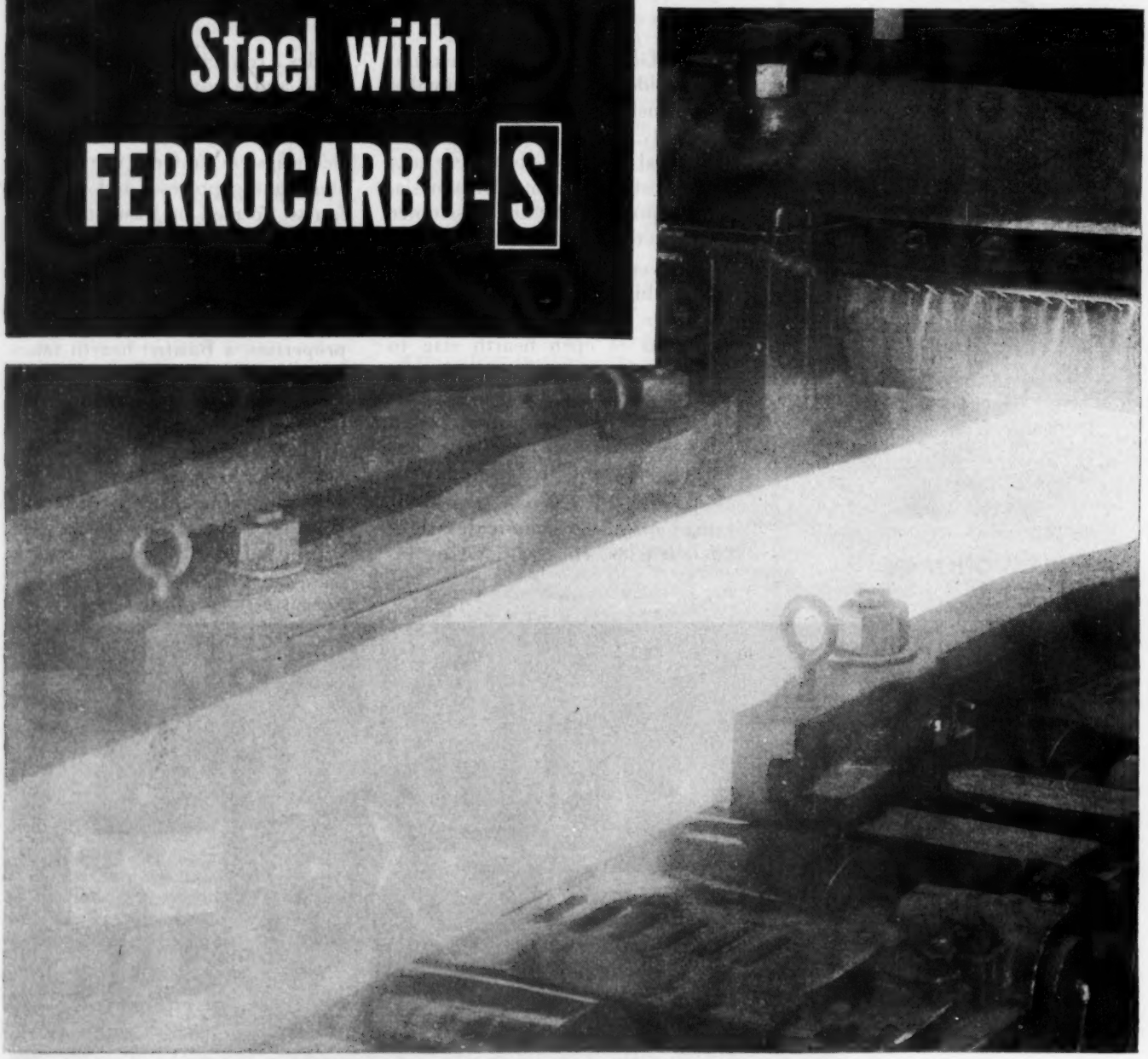
Comparative tests prove that deoxidizing with FERROCARBO-S improves strength and ductility in mechanically worked steel. Many steel users report values for elongation and reduction of area are frequently cut in half when tensiles are made transverse to working direction.

Physical properties are decidedly better. Improvement in transverse physicals is particularly noteworthy. It is brought about by the unique manner in which FERROCARBO-S deoxidation proceeds in molten steel.

Metallographic studies show this deoxidizing reaction reduces the number of inclusions.



FERROCARBO-S is an efficient, economical ladle deoxidizing agent used in making higher quality open hearth and electric furnace steel.

Of even more importance in mechanically worked steel, stringers and segregations are practically eliminated. The few inclusions remaining are dispersed at random throughout the solidified ingot. Greater ductility and strength result.

Our metallurgists are well equipped to furnish detailed information. They are prepared to cooperate with you in pointing out specific advantages of FERROCARBO-S in your operations. Call them in for a discussion at your convenience. Address your request to Department J-117, The Carborundum Company, Niagara Falls, New York.

Add FERROCARBO-S to molten steel and get:

- **Thorough Deoxidation**
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- **Reduction in Number of Inclusions**
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- **Improved Ductility**
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...an even better spring service...

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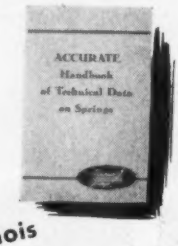
What does all this mean to you? It means that now Accurate offers an *even better* spring service. We will welcome the opportunity to tell you more about what Accurate offers a company like yours.



● *Ask for a copy of the Accurate Spring Handbook. It's full of helpful short-cuts for making spring calculations.*

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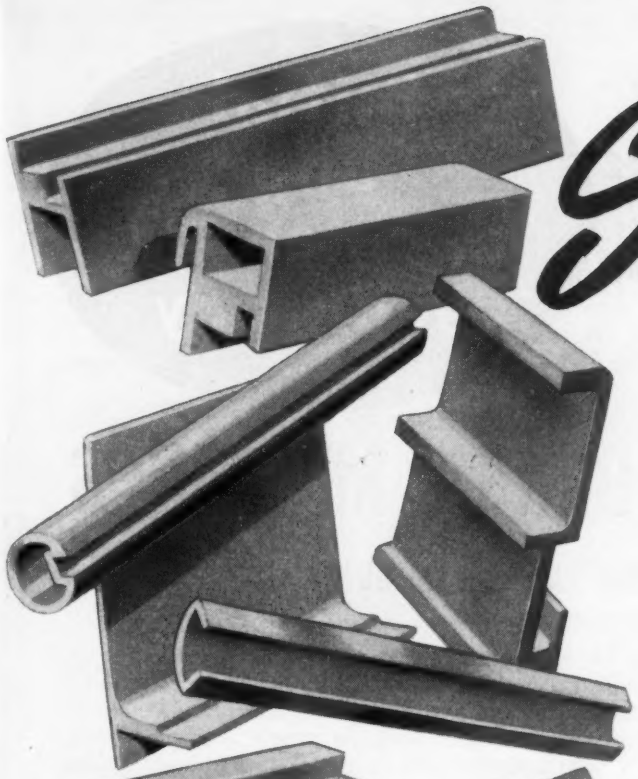

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Lombard 4-Column Hydraulic Extrusion Presses are a development of a leading industrial engineering organization, furnished as a self-contained, compact unit facilitating original installation and re-arrangement to production lines as requirements demand. Because of the simplicity of design and operation, plus rugged construction, low cost of maintenance is assured. Lombard Presses are designed and built to meet the specific application and are installed and put into operation under specialized supervision of the Lombard Corporation Engineers. Equipment is furnished with direct feed pump unit.

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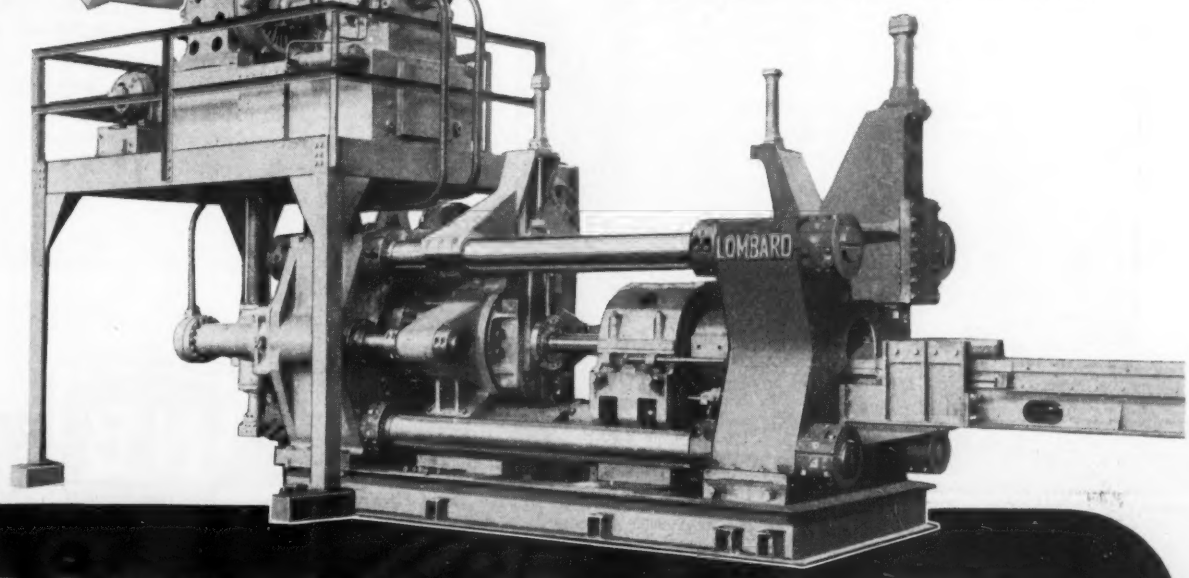

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A NEW LINE OF PRECISION CONTOUR TURNING AND BORING MACHINES

Accurate and Fast — Cam and Air Actuated

Featuring **1.** An endless variety of contours or combinations may be generated with a single-point tool. Besides all the regular jobs of straight precision boring and turning, facing and chamfering, it will produce lands, recesses, flanges, steps, counterbores, and radii.

2. A disc type cam for each table gives positive action consistently throughout the day — from the first to the last piece — uninfluenced by temperature changes.

3. Through positive cam action, tool approaches on rapid traverse to within .005 of the work and immediately starts to feed. Tool may cut on feed-in or drawback stroke, or both for rough and finish cuts. On return stroke, tool jumps clear eliminating drag off marks. When moving between intermittent or successive cuts, tool goes into rapid traverse.

4. Uniform temperature, anti-friction bearings, and super-precision spindles provide spindle speeds up to 7,500 RPM. Mechanical precision chucking operated by air cylinders. Neither chucking nor unchucking operation affects preload or position of spindle bearings.

5. Only one dimension need be inspected on any one set-up, regardless of the number of diameters produced by any one single-point tool. Cams control and positively repeat from piece to piece.

6. Set-up of machine depends entirely upon nature of job. Work may be rotated in spindles or mounted on table, loaded from the front of the spindle or through the spindle. Spindles may be raised, lowered, or separated. Two spindles are standard, but more may be added. Changing job set-up simply requires replacing two cams, setting tool for size and changing chucks.

Model 36

THREE OTHER NEW MACHINES

Latest additions to the New Britain line include: The new, faster, more powerful line of automatic screw machines designed to make the most of carbides on long and short runs, the Model 365, tool rotating, double end chucking machine — and the new line of automatic turret lathes.

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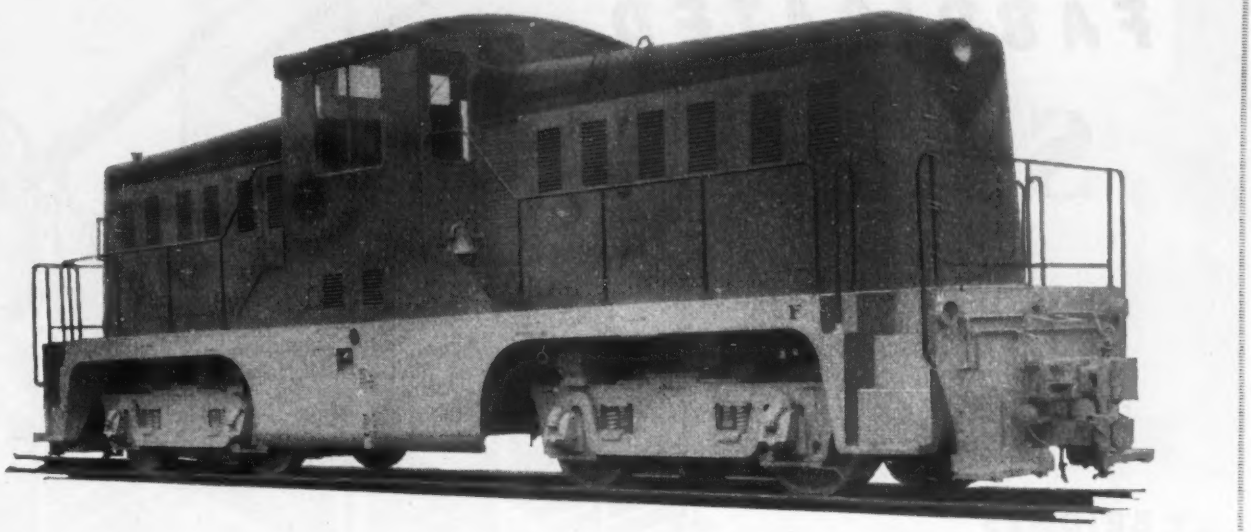

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Your new Whitcomb locomotive will be available for service near 100% of every 24 hours. The average is between 92% and 98%—THAT'S HIGH.

Your new Whitcomb will show a substantial decrease in operating and maintenance costs, around 50% less than the displaced steam job—THAT'S LOW.

Your new Whitcomb will be dependable 100% of the time, executing the toughest switching and hauling assignments quickly and efficiently—THAT'S GOOD.

And, if you will consult with Whitcomb engineers and place your haulage problem before them, they will recommend the locomotive best suited to your specific needs. Not too big or too powerful a locomotive, that would be extravagantly expensive to operate and maintain, nor one that is too small with too little power that couldn't possibly do what you expect of it, but one *THAT'S JUST RIGHT!*

DIESEL ELECTRIC LOCOMOTIVES 25 TO 95 TONS
DIESEL MECHANICAL LOCOMOTIVES 3 TO 30 TONS

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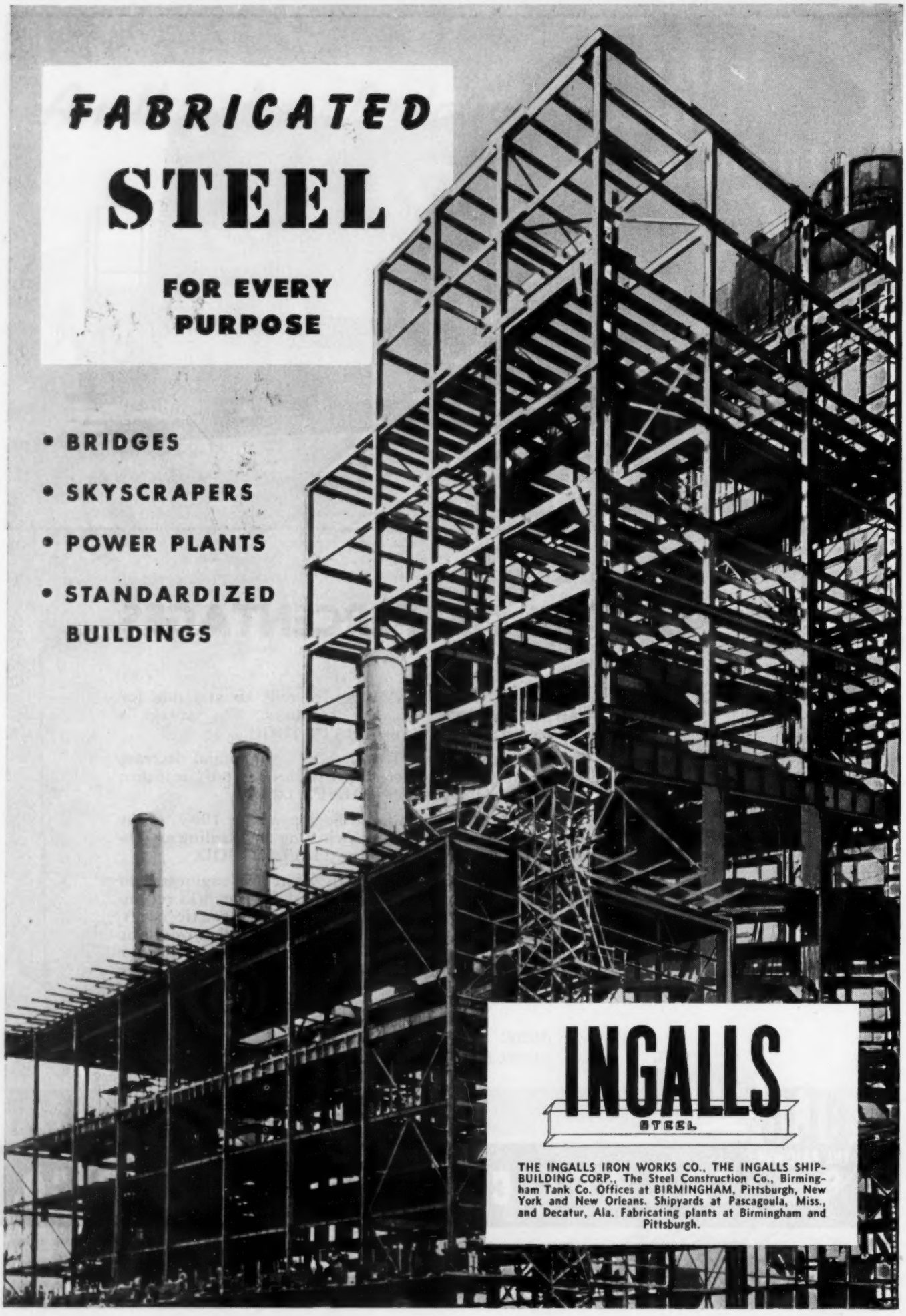
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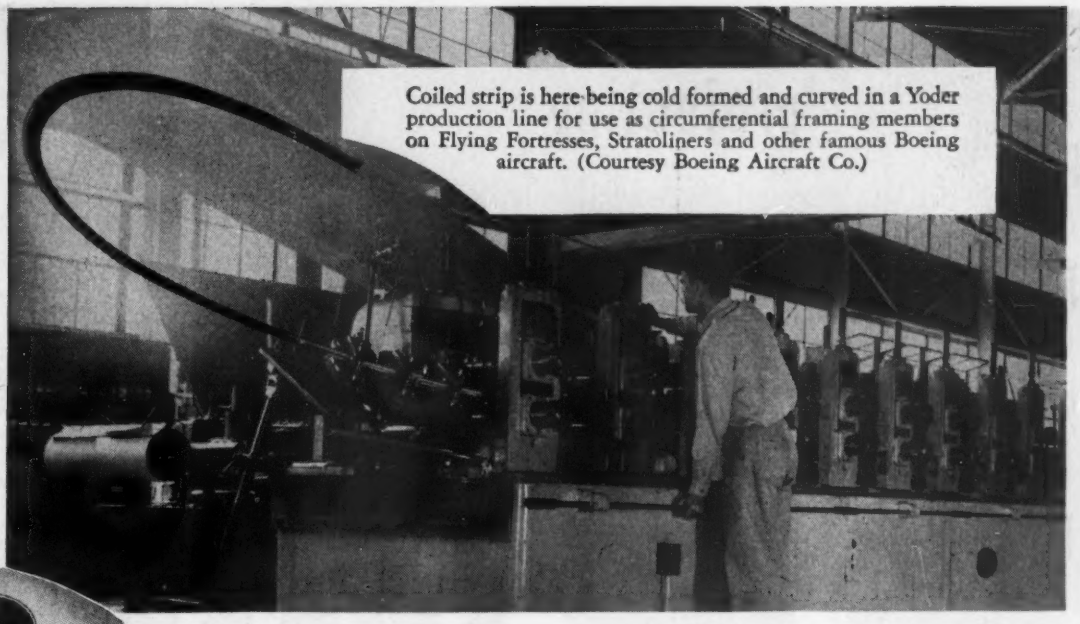
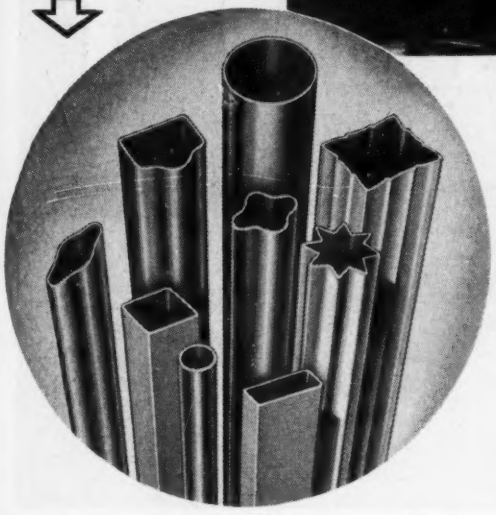
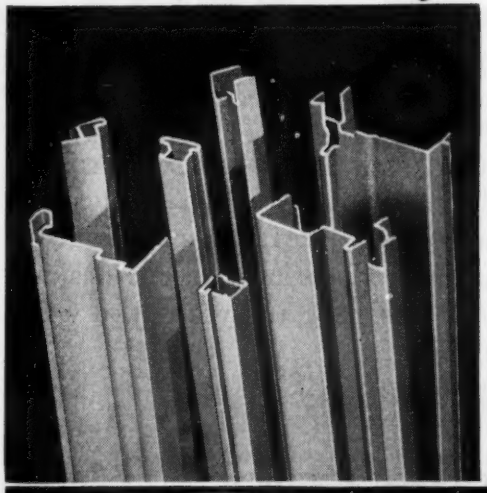


Coiled strip is here being cold formed and curved in a Yoder production line for use as circumferential framing members on Flying Fortresses, Stratoliners and other famous Boeing aircraft. (Courtesy Boeing Aircraft Co.)

Some familiar tubular shapes cold formed in a Yoder roll forming machine. Various kinds of tight or lock-type seams are formed in the same machine, without additional cost.



A typical set of metal window frames and sash components entirely roll formed in a Yoder machine. An infinite variety of structural shapes for framing and covering metal buildings, hollow metal doors, roof and floor systems, partitions and paneling, etc. can be formed in any Yoder machine.



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Series of Seven
No. 5
Conversion Cost

Cold roll forming is recognized as by far the most economical mass production method available for converting flat rolled metal into structural and ornamental shapes, pipe and tubing. This is because one machine, with one single operator, normally is capable of producing about 10,000,000 lineal feet per year.

Even when the total footage to be produced is much smaller, and divided between a number of different shapes, a great reduction in unit cost is obtainable by the use of cold roll formed sections. For instance, assume total operating time of only 100 days per year. Labor and overhead for this period will rarely exceed $3000.00. Add a like amount for annual interest and depreciation on a production of 3,800,000 feet, and the unit cost will be only 16 cents per 100 feet.

Nor do frequent roll changes greatly affect the cost. The average time required for changing rolls is from 3 to 4 hours. At $5.00 per hour, this would mean 5 cents per 100 feet on one single day's production of about 38,000 feet. If the operation is continued for one week on the same section, this cost would gradually come down to one cent per 100 feet.

It will be seen, therefore, that long runs, infrequent roll changes, and continuous operation, are not essentials to low unit cost. *A machine may be operated on short runs, with frequent roll changes, and for much less than 100 days per year, and still be far more profitable than any other machine or method available.*

If you suspect that roll forming might prove practical anywhere in your scheme of production, you may consult us freely, and with the utmost assurance that our estimates and recommendations will be conservative. No obligation, of course.

THE YODER COMPANY
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ENGINEERING YODER MANUFACTURING

ROLL FORMING, TUBE MILL AND SLITTING MACHINERY

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Industrial designers and engineers who specify Follansbee specialty steels are projecting Follansbee time-proved quality into their new products; they are helping to establish their products in a market where the buyer will be king.

It is true that Follansbee Steel products are still in short supply. But it is just as true that the specifications for Follansbee specialty steels are rigidly maintained. Therefore, you can plan to use Follansbee steel in products now in the design stage. Just tell us what types and quantities you will need and when you will need them so that we can advise you as to availability.

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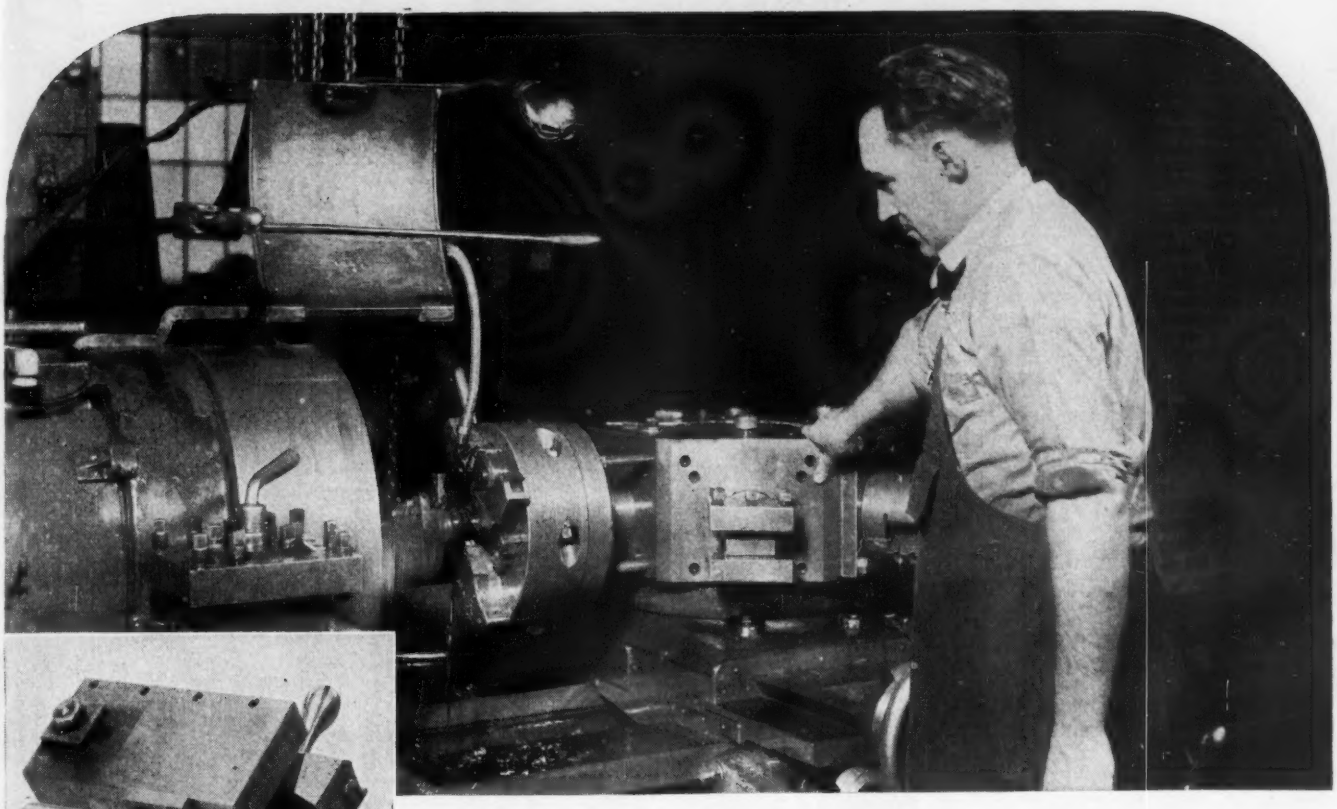
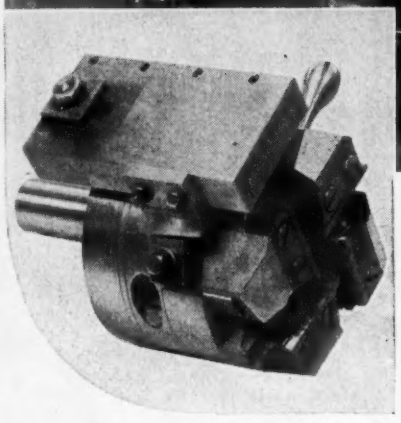
GENERAL OFFICES PITTSBURGH 30, PA.

Sales Offices: New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee.

Sales Agents: Chicago, Indianapolis, St. Louis, Kansas City, Nashville, Houston, Los Angeles, San Francisco, Seattle; Toronto and Montreal, Canada. *Plants:* Follansbee, W. Va., and Toronto, Ohio. *Follansbee Metal Warehouses:* Pittsburgh, Pa., Rochester, N.Y., and Fairfield, Conn. COLD ROLLED STRIP · ELECTRICAL SHEETS POLISHED BLUE SHEETS · SEAMLESS TERNE ROLL ROOFING





"The

LANDMATIC Head

Increased Production Over Other Methods Used" . . .

"Due to the rigidity and design of this tool, we have increased our production over previous methods used. One of our chief troubles in the past has been to hold the lead and taper of our threads while running at high production speeds. This has been eliminated with your head. We are called upon to make standard and extra long length threads. The taper attachment is ideal for this purpose," . . . writes Pittsburgh manufacturer.

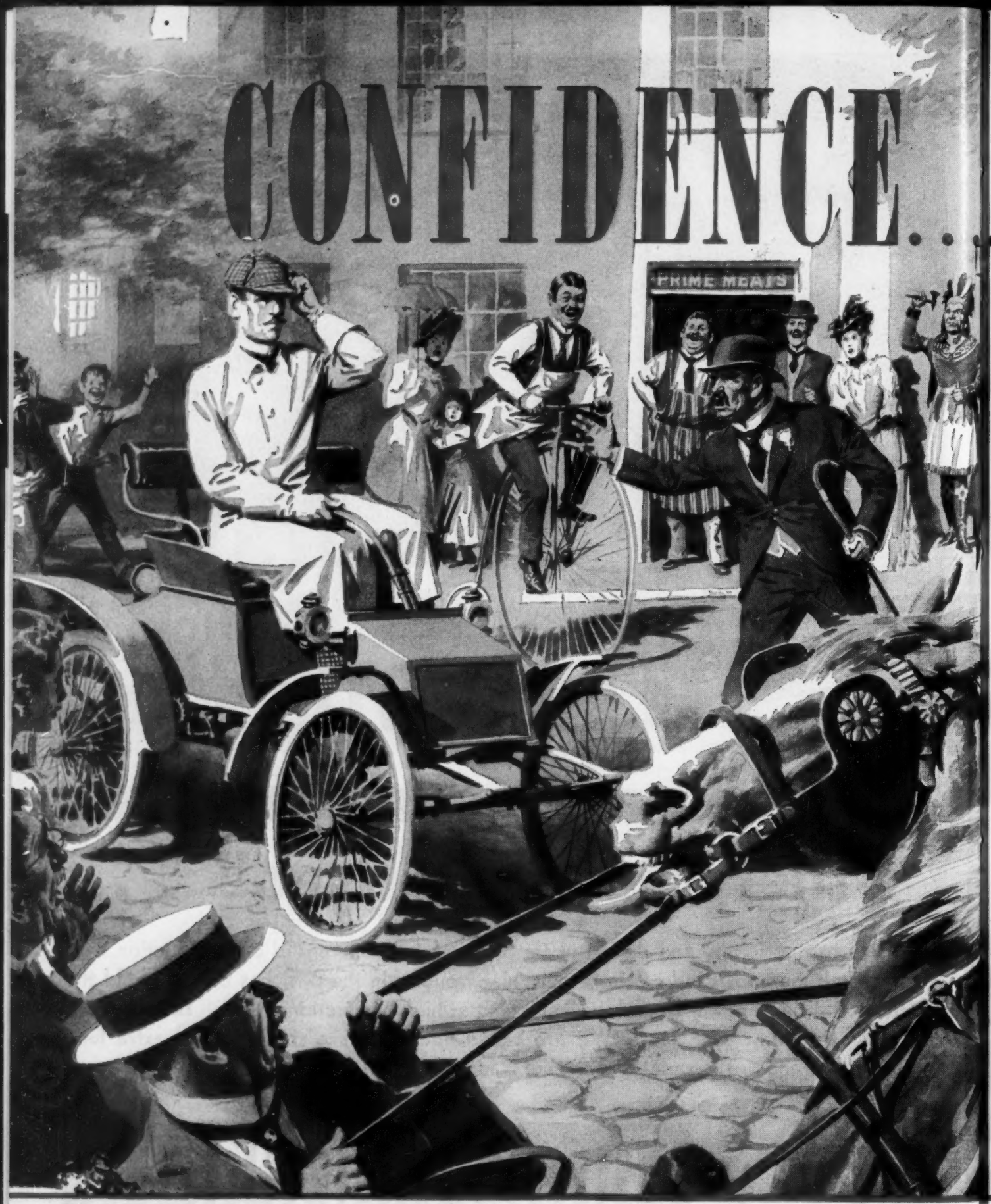
Write for Bulletin F-90

LANDIS
REG. U.S. TRADE MARK PAT. OFF.

LANDIS MACHINE CO.

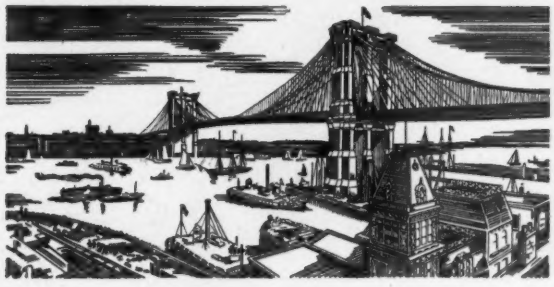
WAYNESBORO, PA., U.S.A.

THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS



Manufacturers of Wire Rope and Strand • Fittings • Slings • Screen, Hardware and Industrial Wire Cloth • Aerial Wire Rope Systems
Hard, Annealed or Tempered High and Low Carbon Fine and Specialty Wire, Flat Wire, Cold Rolled Strip and Cold Rolled Spring Steel • Ski Lifts

.....how much is it worth?



IT WAS NINE YEARS before the first gasoline-driven automobile in the United States was operated by C. E. Duryea that the Brooklyn Bridge was opened in 1883. This fabulous engineering achievement was the culmination of over 26 years of planning and building, of bold vision and heart-breaking struggle, by John A. Roebling and his son Washington.

But the steadfast confidence of father and son in the success of their amazing venture is vindicated daily by the modern traffic this world-famous bridge continues to carry now . . . 64 years later.

How much is that confidence worth to you today . . . and to the John A. Roebling's Sons Company, now embarked on a multi-million dollar expansion program to meet the future's challenge?

Confidence is the driving power behind our efforts to make better products do better work for you.

YOU CAN'T GO WRONG—IF YOU USE THE RIGHT "BLUE CENTER" ROPE

There's no better way to save wire rope dollars than to use the right rope for your job. That means the right grade of steel, the correct construction, the proper size. And your choice is easy when you specify Roebling "Blue Center" Steel Wire Rope.

In "Blue Center" you get what we feel sure is the finest rope steel made. Secondly, you have a wide range of constructions and sizes to choose from . . . in both preformed and non-preformed types.

Why not make the Roebling Field Engineer your right-hand man in selecting wire rope that will give you peak performance? Call him at our nearest branch office.

The *RIGHT* steel . . .
The *RIGHT* construction . . .
The *RIGHT* size . . .
—FOR YOUR JOB!

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

Electrical Wire and Cable • Suspension Bridges and Cables
Aircord, Aircord Terminals and Air Controls • Lawn Mowers

ROEBLING

A CENTURY OF CONFIDENCE

Nowhere is there a better example of Washburn care and precision than in Eagle MUSIC WIRE. Our own basic steel—close tolerances and care in handling, all make for superlative quality.
WASHBURN
WASHBURN WIRE CO., NEW YORK CITY

CLEAN, UNIFORM BILLETS—STRIP—RECTANGULAR, ROUND; FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

12 Reasons Why

HY-TEST Safety Shoes

ARE FIRST CHOICE OF AMERICA'S LEADING SAFETY DIRECTORS

1 SOFT DURABLE QUALITY UPPER LEATHERS
2 SAFE-EZE BACK ONE-PIECE QUARTER NO RIPPING OR BINDING
3 ONE-PIECE SOLE LEATHER COUNTERS LEATHER COUNTER POCKETS
4 STEEL SHANK FOR GREATER SUPPORT AT ARCH
5 T-IRON FULL-GEMMED OAK LEATHER INSOLE
6 SOLES OF THE FINEST QUALITY MATERIALS
7 AUSTEMPERED ANCHOR FLANGE STEEL BOX TOE
8 REGULAR SHOE LAST
9 TOUGH BOX TOE LINER PROTECTS VAMP LINING
10 SHOCK ABSORBING FELT DOUBLER
11 SLANT-EZE TOP FOR LACING COMFORT

12

FULL RANGE OF SIZES, TYPES AND STYLES FOR EVERY SAFETY NEED

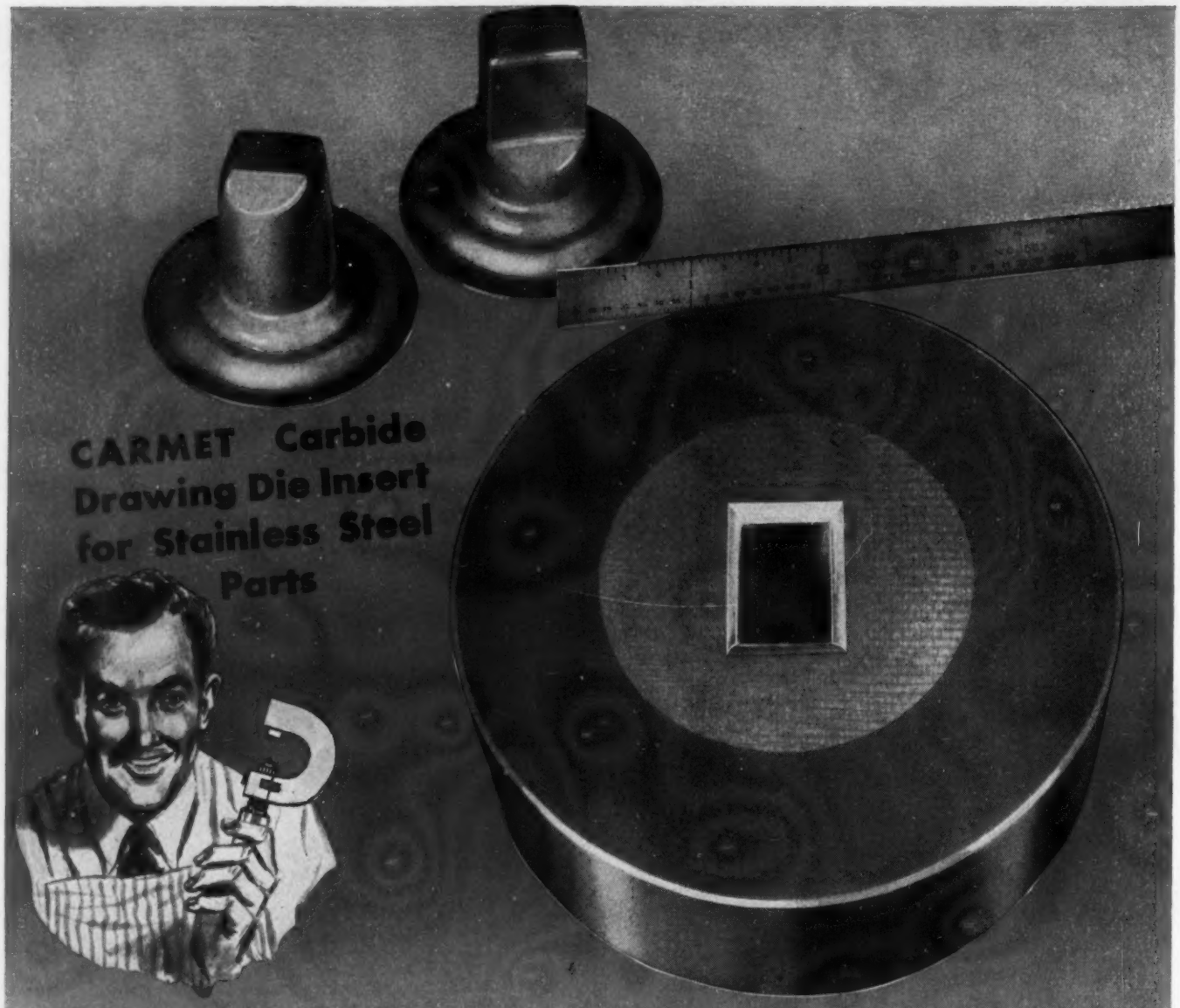
...Insure Workers Feet In Sure Protection

50 DIFFERENT TYPES
9 DIFFERENT KINDS OF SOLES
WIDTHS AA-EEE, SIZES 5-15
5 LASTS (Dress & Work)
WELT AND NAILED CONSTRUCTION

HY-TEST Safety Shoes

HY-TEST SAFETY SHOES

HY-TEST DIVISION • INTERNATIONAL SHOE COMPANY • ST. LOUIS 3, MISSOURI • EASTERN OFFICE • MANCHESTER, N. H.



50% More Production, Perfect Parts with CARMET Draw Dies

This was a *real* "problem" job, but the Carmet-insert draw die above solved it. It not only turned out 50% more stainless steel parts per day, all perfect compared with considerable spoilage before . . . it also produced 50,000 parts, *with no re-working,* compared to less than 1000 parts for the total life of the die it replaced. Remarkable, yes—but you can always expect unusual results from Carmet-edged tools on drawing, blanking or cutting operations, or from Carmet machine parts where great wear-resistance is required. ● Just remember, in addition to the regular line of Carmet cutting tools, we specialize in preforming sintered carbides to practically any specification—supplying them either "as formed," or finish-ground ready for use. *Let us work with you.*

ADDRESS DEPT. S-62

Allegheny Ludlum Steel Corporation

CARBIDE ALLOYS DIVISION, Ferndale (Detroit) Michigan

IS THIS ONE WAY TO CURB INCREASING FOOD PRICES?

Foreign countries will need from 34 million to 38 million tons of our foodstuffs within the next twelve months. Of that some 13½ million tons (forty per cent) or $1,300,000,000 worth will be wheat. That's a lot of wheat. In fact it will amount to 32 per cent, of our total crop for the year 1947-1948.

This is the greatest strain ever placed on our food production. It is 37½ times the quantity of wheat we exported in 1936-1937, only 11 years ago.

Economists tell us that, for every $500,000,000 of food we export this coming year, our own farm price index is going to rise 17 points. So that, based on our forthcoming wheat exports alone, we can expect to see a rise of 44 points in our domestic food price index by the Fall of 1948. Include the values of the other foods we are sending abroad and the rise will be closer to 100 points. No one needs to explain what this increase is going to do to salaries and wages.

We cannot solve this problem with food exports no matter how we increase them, for even if the entire world's production of food could be restored to the normal of 1939 level, this would be inadequate to feed world population today. The reason is simple. This planet's human beings —despite the slaughter of war—have increased at the rate of 20,000,000 a year for the past eight years.

However, there is an answer. It can be found in heavy exports of farm machinery—especially tractors—during this coming winter and early spring.

Europe alone is asking now for 12,000 heavy tractors and 14,000 light tractors with which to plough and cultivate her fields.

With one light tractor, European farmers can cultivate 50 acres of land, raise an average of 20 bushels of wheat. With one heavy tractor (using American methods of cultivation) they can handle 1,000 acres of land, raise 20,000 bushels of wheat.

If we can get the 26,000 needed tractors to Europe we can increase her grain production a conceivable 250,000,000 bushels—cut our own wheat exports 55%; curtail our rising price index.

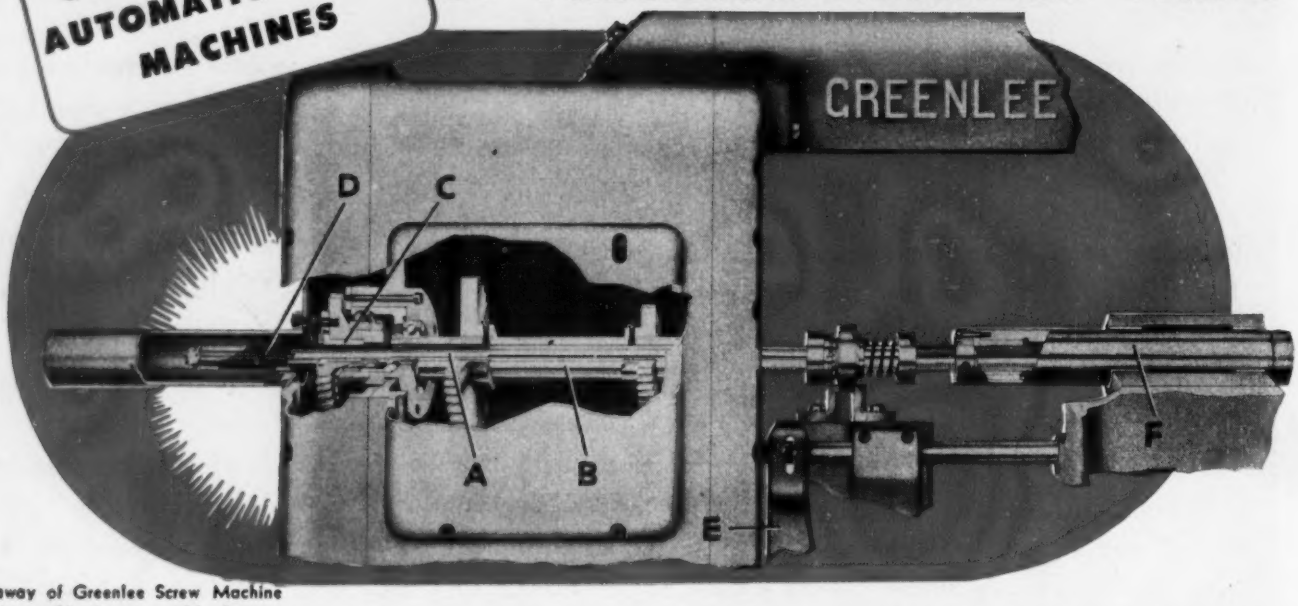
Europe cannot do it for herself. Indicative of her painfully slow recovery for example, is the fact that the first locomotive built in France since the war has just been delivered. It took 18 months to build. Her tractor industry is in similar shape.

By exercising wise foresight now we can hold our prices and our domestic economy in line. We can help the rest of the world help itself.

Charles A. Koons

CHARLES A. KOONS & COMPANY, EXPORTERS • 620 FIFTH AVENUE • NEW YORK 20, N. Y.
Steel-Machinery of all descriptions

New LEAD-SCREW FEED ON GREENLEE AUTOMATIC SCREW MACHINES Speeds Production OF PRECISION-THREADED PARTS



Cut-away of Greenlee Screw Machine showing combination cam-and-lead-screw-operated threading spindle in 5th position

NO SPECIAL CAMS OR SPEED GEARS REQUIRED — SIMPLE DESIGN SAVES TIME AND MONEY . . .

Here at last is a screw machine development offering an economical solution to the problem of cutting precision threads at production speeds. This new cam-and-lead-screw-operated threading arrangement for the Greenlee "6" gives a rapid approach, accurate threading-in and threading-out, and a quick withdrawal. It speeds production and insures a uniform, high-quality thread with a very accurate lead.

As illustrated, the Threading Spindle Drive Shaft "A", which is driven by Splined Sleeve "B", is relieved of splines at its outer end. Driven at a constant speed, bronze Lead-Screw Nut "C" engages precision Lead Screw "D" to produce the necessary lead. Cam-operated Lever "E" handles the rapid approach and quick withdrawal. Precise adjustments for depth are made by setting Spindle "F" on the threaded Drive Shaft "A".

7 Cost-Saving Features

- Cuts costs of producing parts requiring precision threads.
- Positive lead-screw feed insures uniform high-quality results.
- Reduces scrap losses.
- Simple design plus interchangeable feature cuts equipment and re-tooling costs.
- Increases work handling capacity.
- Quick and easy adjustments save set-up time.
- Easily adapted to old machines at nominal cost.

Economical To Use — Completely Interchangeable

To cut threads with different taps or chasers, it is only necessary to change the easily-removed lead screw and nut. Lead screws and nuts with different leads can be made to order in your own tool room and are easy to store. Thus, a wide variety of work can be handled, quickly and economically. Lead-screw threading operations can be handled in 3rd, 4th, and 5th positions. *In addition,* by simply removing the lead screw and nut, the Greenlee "6" can be quickly changed-over to handle ordinary jobs. No special cams or speed gears are required.

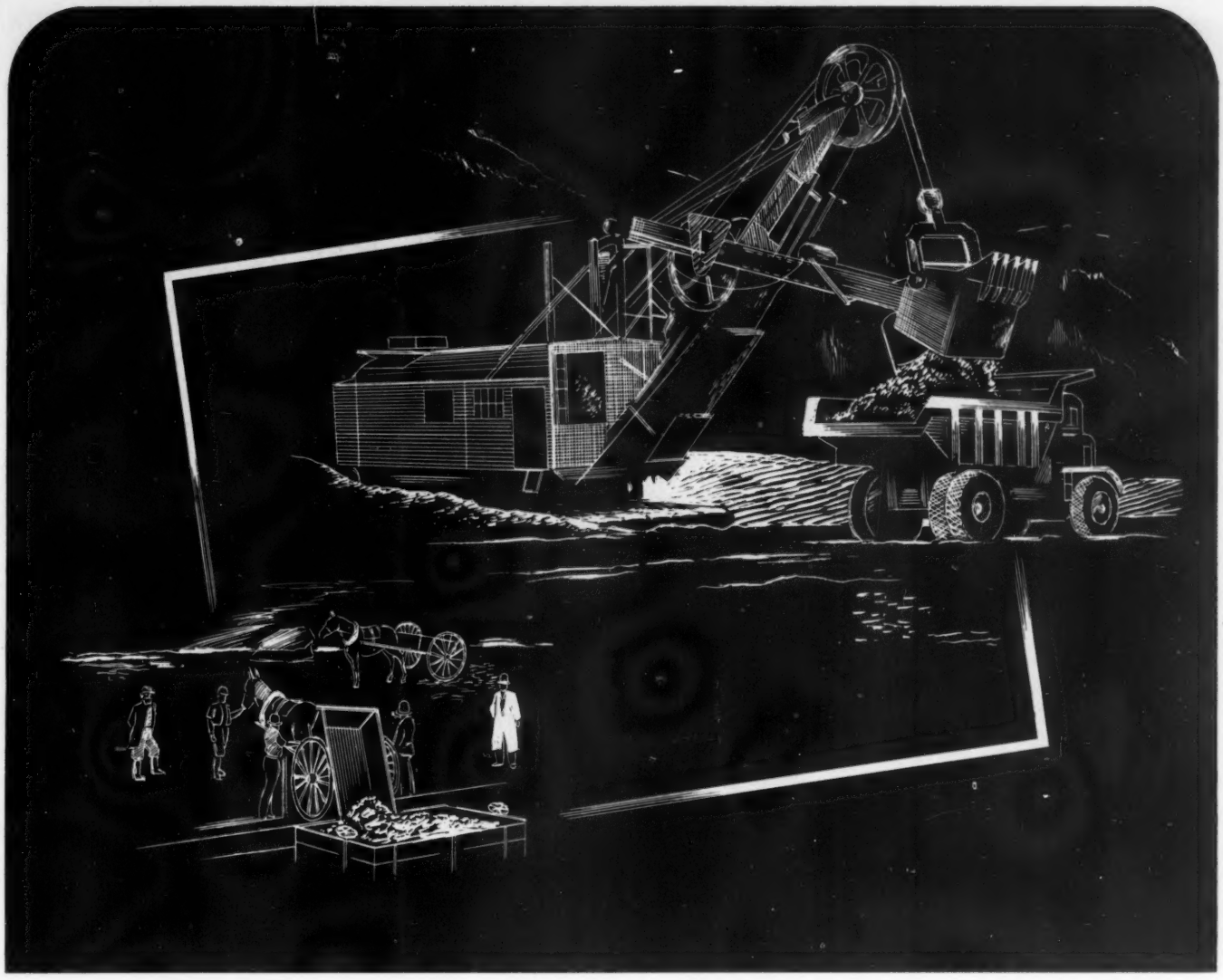
PRODUCTION MACHINERY
GREENLEE

WRITE FOR DETAILS TODAY

Get facts on how you can speed up production, reduce scrap losses, and increase your work handling capacity with a Greenlee "6". Conversion parts are available for all Greenlee Sixes now in use. To avoid delays, write now for full details.

GREENLEE BROS. & CO.
1931 MASON AVENUE
ROCKFORD, ILLINOIS

MULTIPLE-SPINDLE DRILLING, BORING, TAPPING MACHINES • AUTOMATIC SCREW MACHINES • AUTOMATIC TRANSFER PROCESSING MACHINES



SINCE 1850

THE IRON ORE INDUSTRY

has kept pace with the demands of science and industry in the production of ferrous metal. Through four great wars and through the greatest century of mechanical development in the history of mankind it has met and satisfied every demand that has been made upon it.

LAKE SUPERIOR IRON ORE • FERRO ALLOYS
VESSEL TRANSPORTATION • COAL

THE Cleveland-Cliffs IRON COMPANY

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

GRANITE CITY STEEL

The facilities of Granite City Steel Company have always been large enough to permit the use of the most modern production methods developed by the industry. And they have been small enough to permit the scrupulous attention to detail that is necessary to the production of the finest quality steel. That is why Middle America buys its fine quality steel by this name — Granite City Steel.

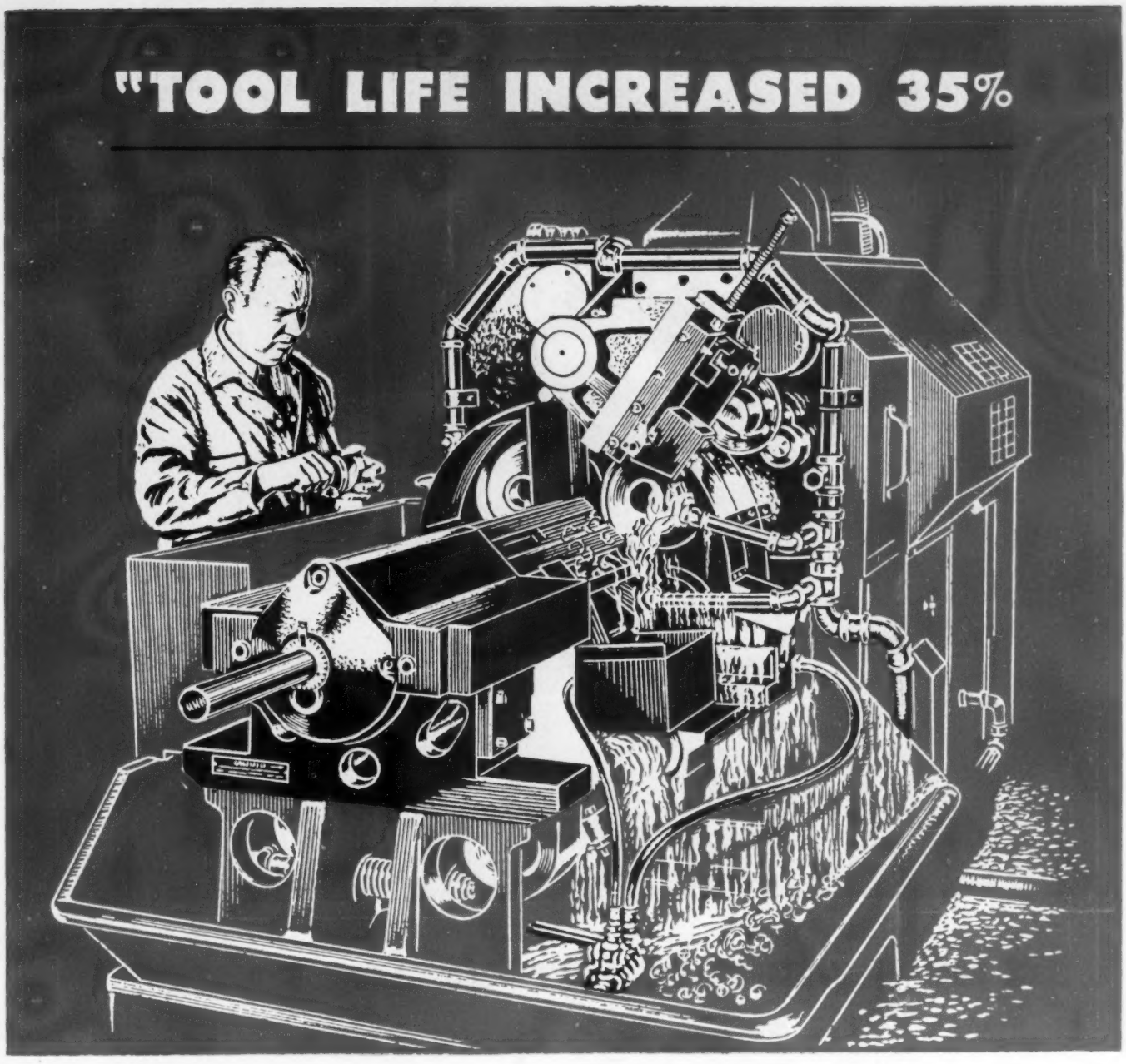
GRANITE CITY
Steel Company

GRANITE CITY, ILLINOIS

STRIPLATES
ELECTRICAL SHEETS
COLD ROLLED SHEETS
HOT ROLLED SHEETS
PORCELAIN ENAMELING SHEETS
STAINLESS-CLAD SHEETS AND PLATES
TIN MILL PRODUCTS
TERNE PLATE
TIN PLATE

DALLAS
INDIANAPOLIS
KANSAS CITY
MEMPHIS
MINNEAPOLIS
MOLINE
ST. LOUIS
OKLAHOMA CITY

"TOOL LIFE INCREASED 35%



. . . when we switched to Tycol No. 675"

TYCOL
INDUSTRIAL LUBRICANTS

Boston • Charlotte, N. C.
Chicago • Detroit
Pittsburgh • Philadelphia
Tulsa • Cleveland
San Francisco

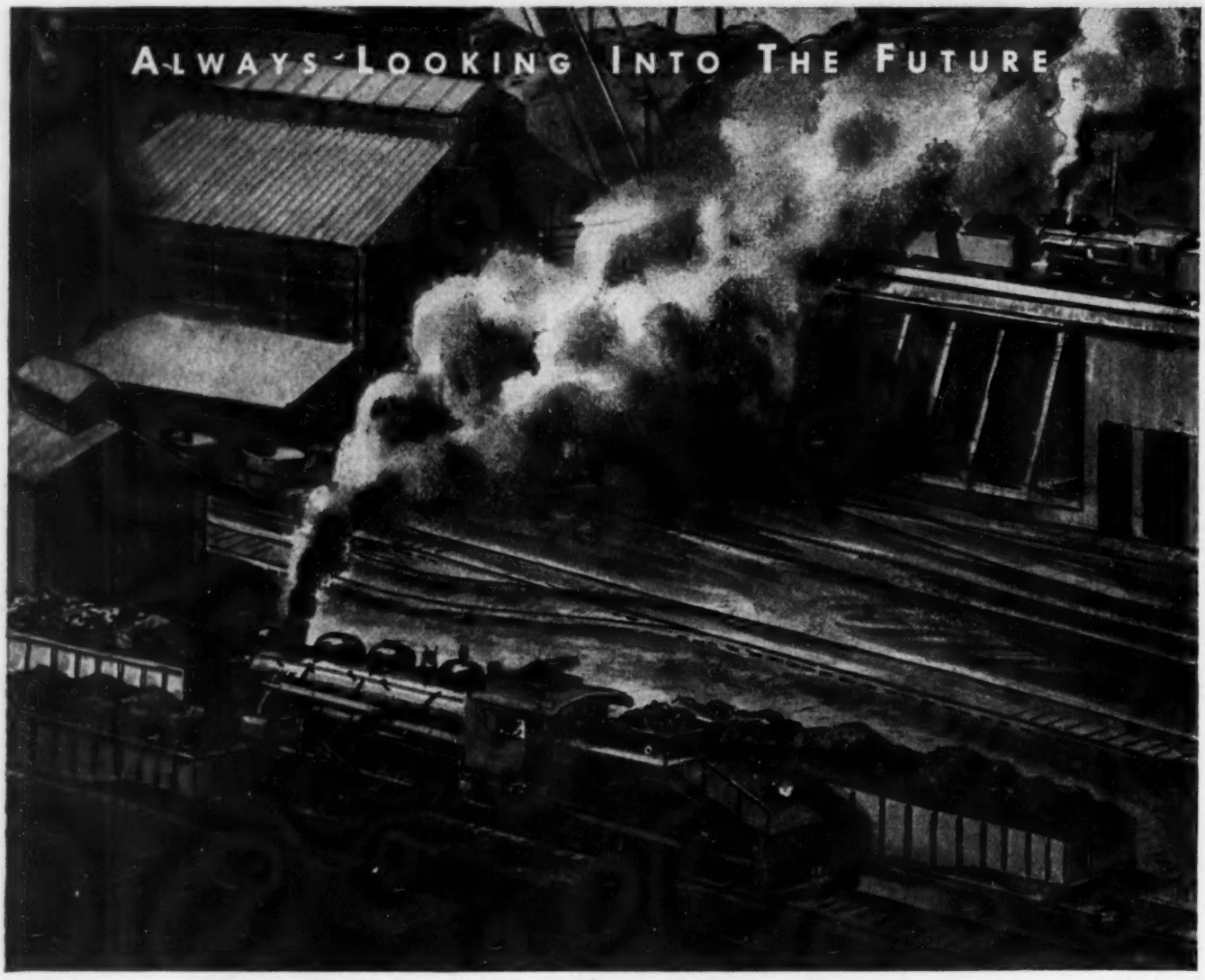
TIDE WATER ASSOCIATED OIL COMPANY
17 BATTERY PLACE · NEW YORK 4, N. Y.

"Chips no longer weld to tools..
Tool regrindings reduced...
Gum deposits eliminated . . .
No more trouble with rust..."

These are a few advantages observed at one large plant using Tycol No. 675 Heavy Duty Cutting Oil. You, too, will find that Tycol No. 675's demonstrated superiority will help you increase production . . . cut costs . . . produce finer, tarnish-free finishes.

For complete data about Tycol No. 675 Heavy Duty Cutting Oil, phone your nearest Tide Water Associated Office . . . NOW.

LUBRICATION—"ENGINEERED TO FIT THE JOB"



a new plant for producing oxygen in tonnage quantities

The first plant designed for the commercial production of low purity oxygen in tonnage quantities is now nearing completion. It was designed by Air Reduction and is being installed to supply oxygen to a steel plant for metallurgical purposes. Operation of this plant will provide accurate determination of manufacturing procedures in producing such oxygen, and allow exploration of large scale applications of this new product to iron and steel manufacture.

The giant steel industry is one of the important fields in which the use of tonnage oxygen is being studied for the purpose of speeding production and reducing manufacturing costs.

This is another outstanding example of Airco's policy of pioneering time-saving and product-improving processes that are useful to industry. The experience and facilities of our Technical Sales and Research Divisions are at your disposal in applying Airco techniques to your manufacturing problems.

★ ★ ★

If you are interested in obtaining further information, please address: Technical Sales Division, Air Reduction, 60 East 42nd Street, New York 17, N. Y.

AIRCO **AIR REDUCTION**

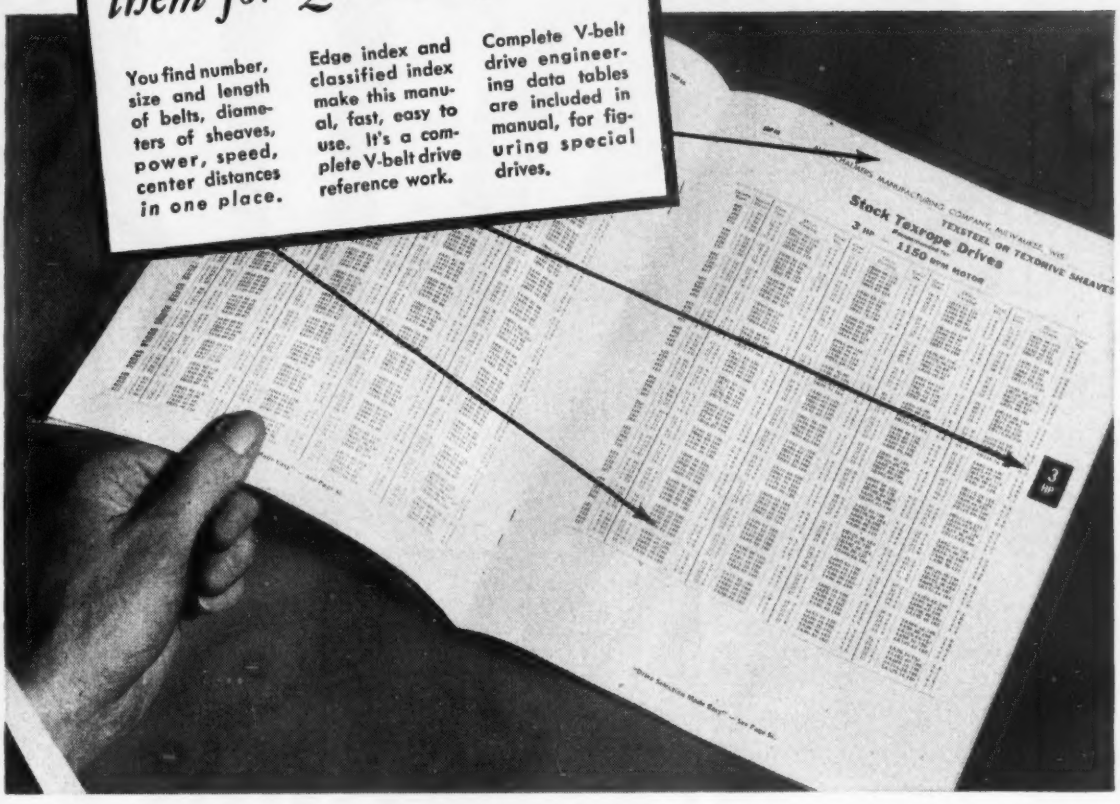
Offices in All Principal Cities

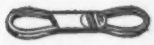
Originators of Modern Oxyacetylene Flame and Electric Arc Methods For ALL Industry

90% OF ALL V-BELT DRIVE PROBLEMS SOLVED ECONOMICALLY WITH TEXROPE

Pre-Engineered Drives

TEXROPE .. Greatest Name in V-Belt Drives

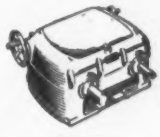

This New Manual Lists them for Quick Reference
You find number, size and length of belts, diameters of sheaves, power, speed, center distances in one place.
Edge index and classified index make this manual, fast, easy to use. It's a complete V-belt drive reference work.
Complete V-belt drive engineering data tables are included in manual, for figuring special drives.
Stock Texrope Drives
TEXSTEEL OR TEXDRIVE SHEAVES



"Super 7" V-BELTS
Five Types — Sizes to suit every power transmission job.

Texsteel, Texdrive, "Magic-Grip"
— sheaves in a full range of sizes, grooves.

"Vari-Pitch" SHEAVES
Exact variations in speed, stationery or motion control.



SPEED CHANGERS
Speed variations up to 375% at the turn of a crank.

ENGINEERING
Finest V-Belt engineering talent in the world—at your call.

TEXROPE "Super 7" V-Belts result from the cooperative research of two great companies — Allis-Chalmers and B. F. Goodrich. They are sold only by A-C.

USING STOCK BELTS AND SHEAVES, Texrope engineers have selected the *best* drive for each requirement . . . the drive most economical in first cost and in maintenance.

Only Allis-Chalmers offers you this complete Pre-Engineered drive manual. It is the product of 23 years of industrial V-belt drive experience, the finest engineering talent in the business.

Here is a book that will save you time and money in the purchase of V-belt drive equipment. Copies have been sent to many Texrope users and dealers. If you don't have a copy yet, write for Texbook No. 20P40. ALLIS-CHALMERS, MILWAUKEE 1, WIS. A 2335

Texrope, Super-7, Texsteel, Texdrive, Magic-Grip and Vari-Pitch are Allis-Chalmers Trademarks

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947
A CENTURY OF SERVICE to Industry THAT MADE America Great

Unusual problems solved by National

WHEN AUTOMOBILE PARTS are made of seamless tubing instead of solid forgings or castings you save in labor and material and get greater uniformity in the finished part.

22 VARIETIES of seamless pipe and tubing for refineries are made by National. The line includes pipe and tubing for high-pressure, high-temperature service where corrosion and scaling are serious problems.

Seamless

ALMOST every day some new or unusual pipe or tubing problem is put up to National Tube Company for solution.

A manufacturer of piston pins wasn't entirely satisfied with his output. Since he started using U·S·S SHELBY Seamless Tubing instead of solid bar stock, he has made millions of piston pins to a tolerance of 1/1000". Production costs have been greatly reduced and the product is more uniform in quality.

A large refinery handling corrosive liquids at high temperatures and pressures wanted the pipe lines to stand up longer under this severe service. NATIONAL metallurgists helped them choose the right seamless pipe and tubing for each application with the result that "down time" for maintenance has been greatly reduced with a consequent increase in production.

Engineers designing new high pressure boiler plants have come to NATIONAL for special seamless alloy steel boiler tubes which reduce the possibilities of failure to an absolute minimum.

Automotive manufacturers have discovered that SHELBY Seamless Mechanical Tubing can be used for dozens of applications such as bearing shells, torque tubes and steering gear members.

Possibly you can replace expensive castings or forgings with low cost parts made from seamless tubing.

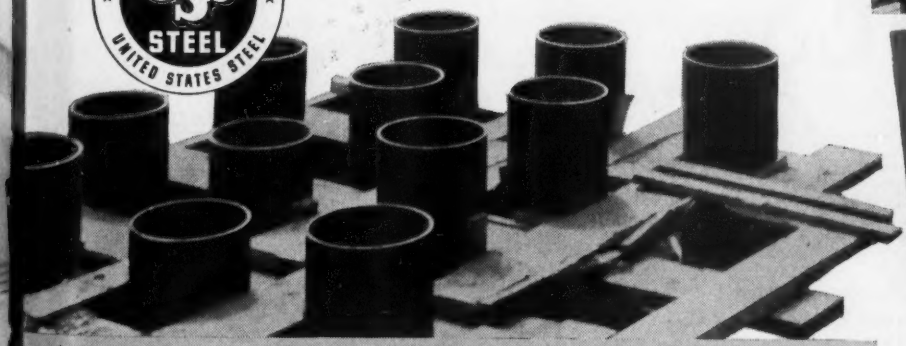
Or, you may be able to keep your plant operating for longer periods by the use of modern seamless steel pipe.

In either case, NATIONAL metallurgists and engineers are available for consultation. They are thoroughly experienced and can help you solve your pipe and tubing problems.

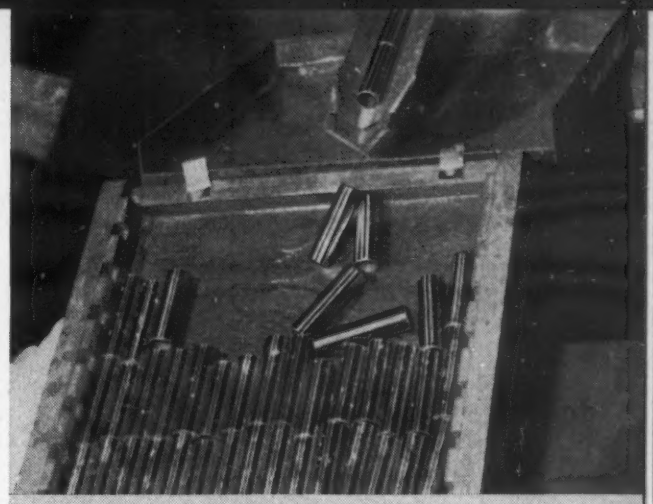
NATIONAL TUBE COMPANY

Pittsburgh, Pa.

Columbia Steel Company, San Francisco, Pacific Coast Distributors
United States Steel Export Company, New York



NATIONAL SEAMLESS PIPE PILING offers greater bearing capacity for a given space than any other type of piling. Can often be driven where other piling is unsuitable.



PISTON PINS—sized to a tolerance of under 1/1000" made of "Shelby" Seamless Tubing. Stock of mechanical tubing ranges from ¼" all the way up to 10¾" O.D. in carbon steels, alloy steels, and stainless steels.

"WALLS WITHOUT WELDS" — pierced from solid steel—seamless means boiler tubes with absolutely uniform wall strength—no longitudinal line of potential weakness. National Seamless tubes are ductile and can be worked readily.

NATIONAL SEAMLESS Pipe and Tubing

WALLS WITHOUT WELDS

UNITED STATES STEEL

HAYNES

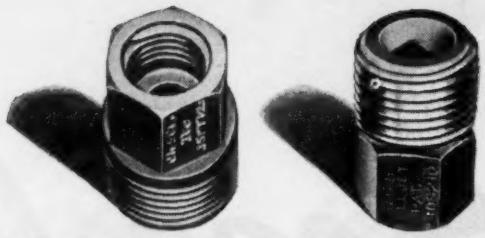
Precision Casting

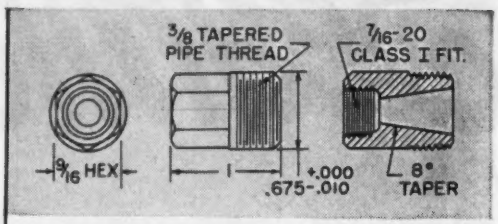
permits wide range of design for parts that must be strong... hard ...and corrosion-resistant...even at high temperatures

The HAYNES precision casting process now makes it possible for engineers to specify alloys with unusual engineering properties—such as HAYNES STELLITE alloys, HASTELLOY alloys, or the recently developed high-temperature alloys. Improved designs are possible because parts can be engineered for performance rather than for convenience of fabrication.

Precision castings are made to strict physical and metallurgical standards. Parts of intricate shapes and contours are cast so that little or no finishing is required.

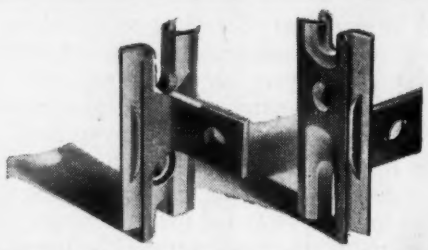
For further information, write for the booklet, "HAYNES Precision Castings."

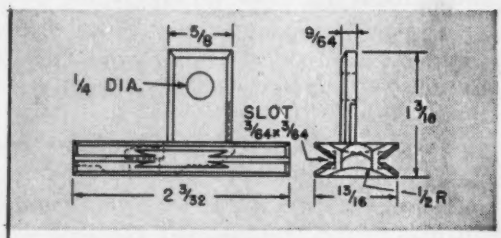




1. PART: Spray Nozzle Body

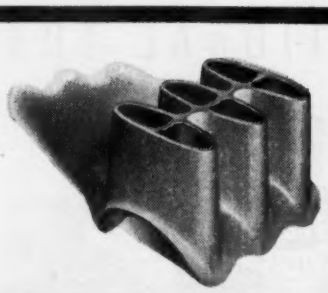
Machining this part from bar stock is more expensive than precision casting it from corrosion-resistant HASTELLOY alloy C.

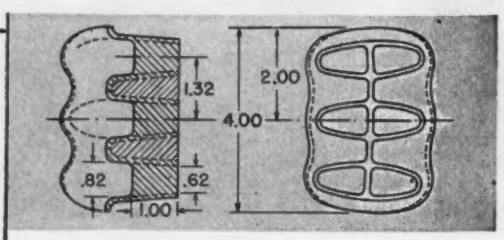




2. PART: Reciprocating Slide

Precision casting this slide, used in cloth-cutting machinery, from HAYNES STELLITE alloy No. 6 saved 42 machining operations.





3. PART: Jet Outlet Nozzle

This part is precision-cast of HAYNES STELLITE alloy No. 21 because it did not hold its shape when fabricated from sheet metal.

HAYNES

TRADE-MARK

alloys

Haynes Stellite Company

Unit of Union Carbide and Carbon Corporation

UCC

General Offices and Works, Kokomo, Indiana

Chicago—Cleveland—Detroit—Houston—Los Angeles—New York—San Francisco—Tulsa

The registered trade-marks "Haynes", "Haynes Stellite", and "Hastelloy" distinguish products of Haynes Stellite Company.

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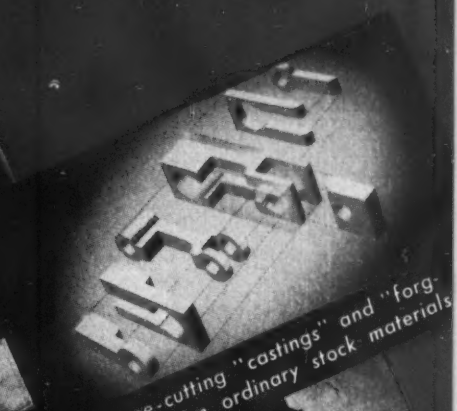
INDUSTRY'S MULTI-PURPOSE PROCESS
FOR FASTER LOW-COST PRODUCTION
. . . FOR CUTTING ALL MATERIALS

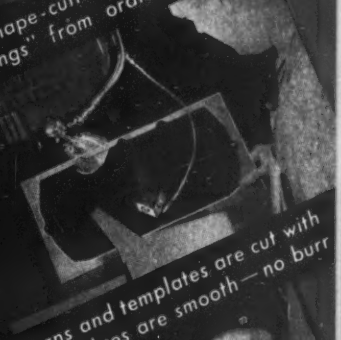
Contour Sawing

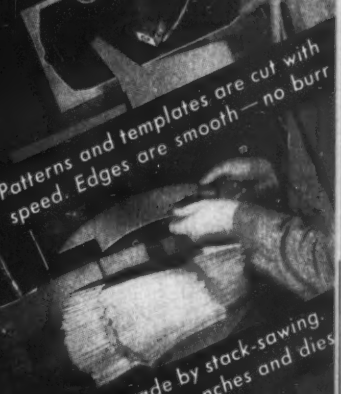
Sweeping economies in die making over old methods



Shape-cutting "castings" and "forgings" from ordinary stock materials

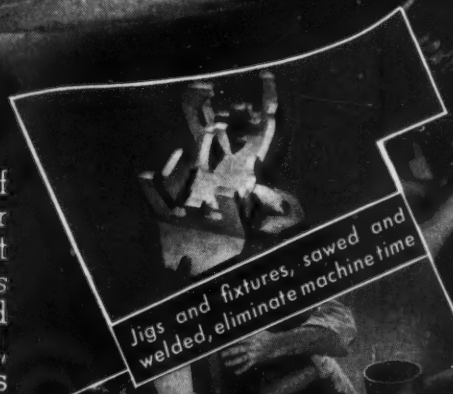
Tools of all kinds like these micrometer parts are cut fast, accurately



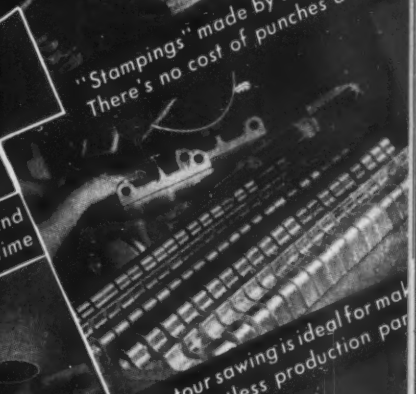


Patterns and templates are cut with speed. Edges are smooth—no burr

19 Models

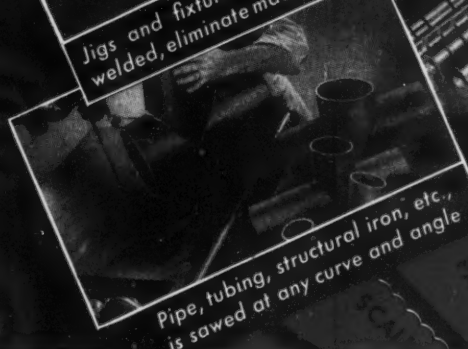


Jigs and fixtures, sawed and welded, eliminate machine time



"Stampings" made by stack-sawing. There's no cost of punches and dies

Contour sawing is ideal for making countless production par



Pipe, tubing, structural iron, etc., is sawed at any curve and angle

Contour Sawing saves industry thousands of man-hours every day. It differs from other machine-tool processes in that it does not waste time "whittling" stock to shape but *slices* off unneeded parts – even hard alloys and tungsten carbide. Makes internal or external, curved or straight cuts at any angle. Operators trained in few days – do not need years of machinists' experience. With many special blades and infinitely variable speeds, *Contour Sawing* cuts anything and makes amazing production economies in all industries. Ask about the special DoAll customer research service, free movie for industrial groups, schools, etc. ●

Blades for Every Purpose

Iron . . Steel . . Copper . . Brass . . Alumin
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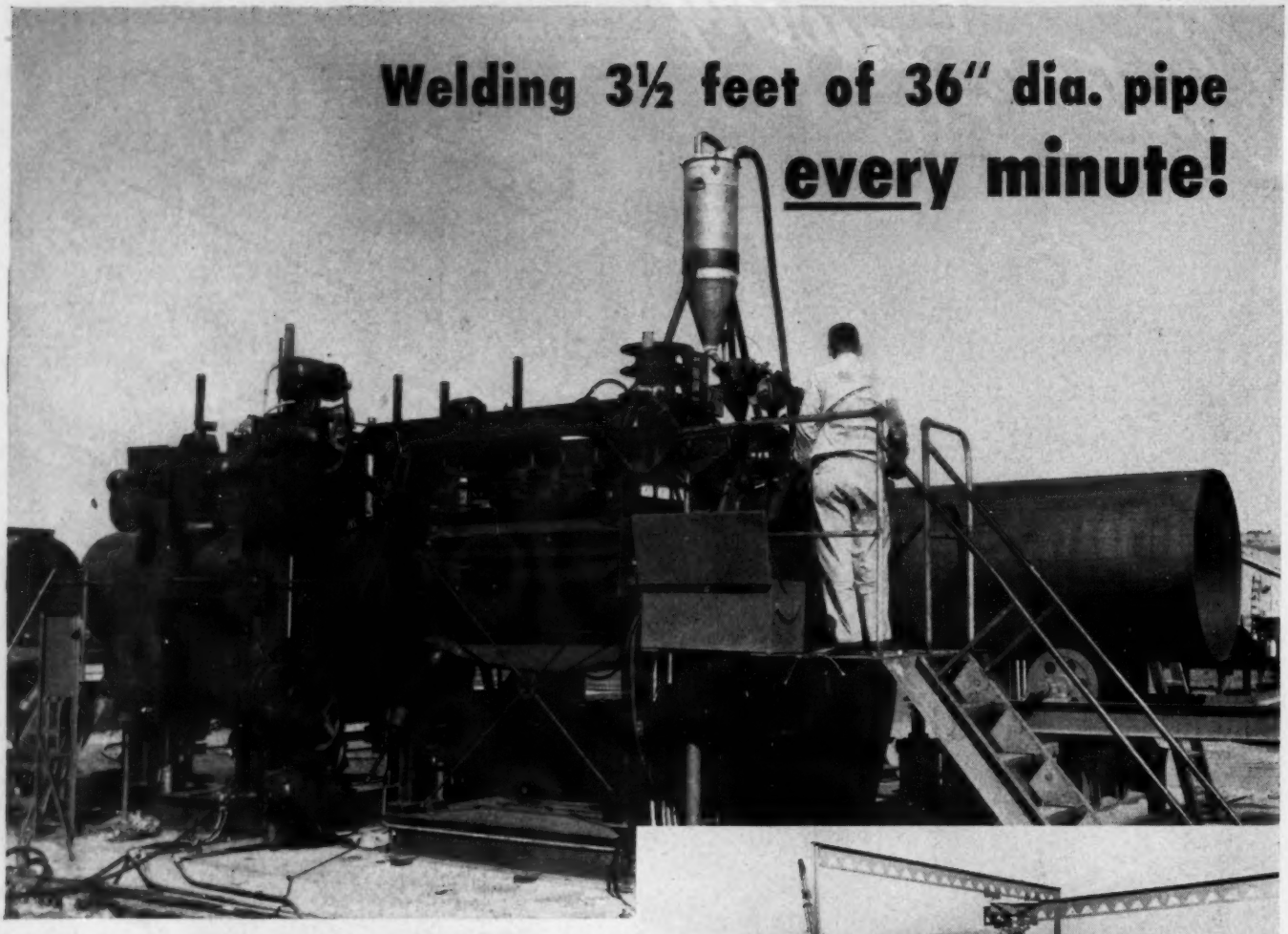
DoALL STORES IN KEY CITIES

Des Plaines, Illinois

Welding 3½ feet of 36" dia. pipe every minute!

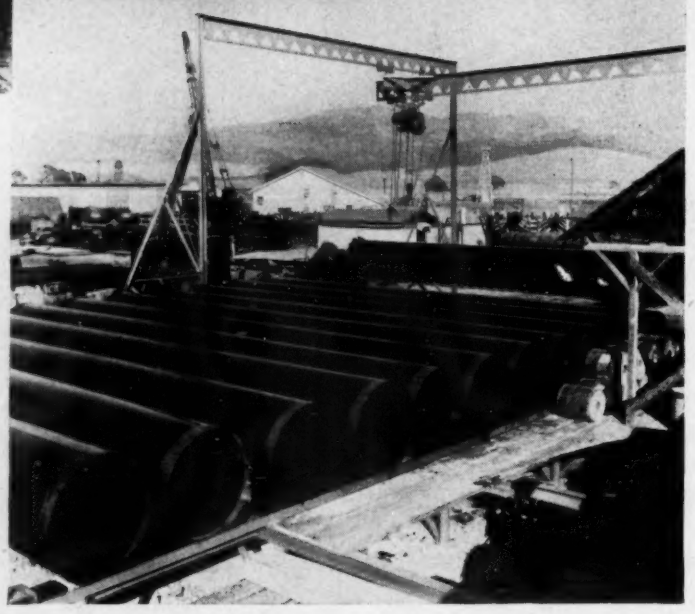


These Berkeley 3-C Continuous Longitudinal Seam Welders are welding 5/16" thick, 36" diameter steel pipe at the rate of 3½ feet per minute at the Basalt Rock Co. plant, Napa, California. The pipe is to be used on the Conn Dam project.

"Berkeleys" were chosen for this job because they have repeatedly demonstrated their superior performance and efficiency in other large-scale pipe making projects. Welding the longitudinal seams on 30 ft. sections of large diameter pipe in less than 9 minutes is not unusual for the 3-C "Berkeley." Other Berkeley Mills have comparable performance records in welding the seams of preformed tubes 5" to 36" in diameter.

A Berkeley Long Line Feeder is used to facilitate feeding the heavy, cumbersome rolled sections to the loading end of the mill. The conveyor (seen at the forward end of the mill) carries the welded pipe to succeeding operations in an uninterrupted flow to the shipping dock (lower Picture).

If your product requires seam welding of any tubular shape from 5" to 36" in diameter it will pay you to investigate the time and cost-saving advantages of a "Berkeley."



Other Penn Tool & Machine Co. welding jigs and fixtures are solving production welding problems for every type of industry . . . they are reducing production time and costs wherever they work.

The design and manufacture of welding jigs and fixtures has been our business for many years.

Our engineering skill, experience and modern plant facilities are at your service.

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They just can't carry this load too long!

INADEQUATE WIRING, the industrial jinx, is too heavy a burden for any factory power lines. For, overtaxed, overextended, obsolete wiring can cut operating efficiency 25 to 50 percent.

And, sooner or later, this sinister acrobat causes tie-ups that result in costly shut-downs for extensive alterations.*

Call in your plant power engineer, consulting engineer, electrical contractor or utility power salesman. These are the men who can throw a net over him!

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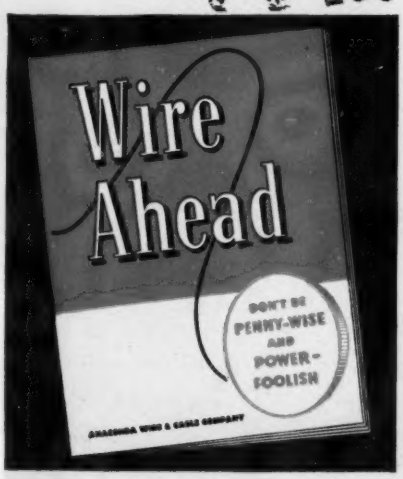

*WIRE AHEAD, a new booklet discussing preventive maintenance . . . the symptoms of inadequate wiring . . . and presenting plans for anticipating electrical demand, is now available on request. Address Advertising Department, 25 Broadway, New York 4, N.Y.

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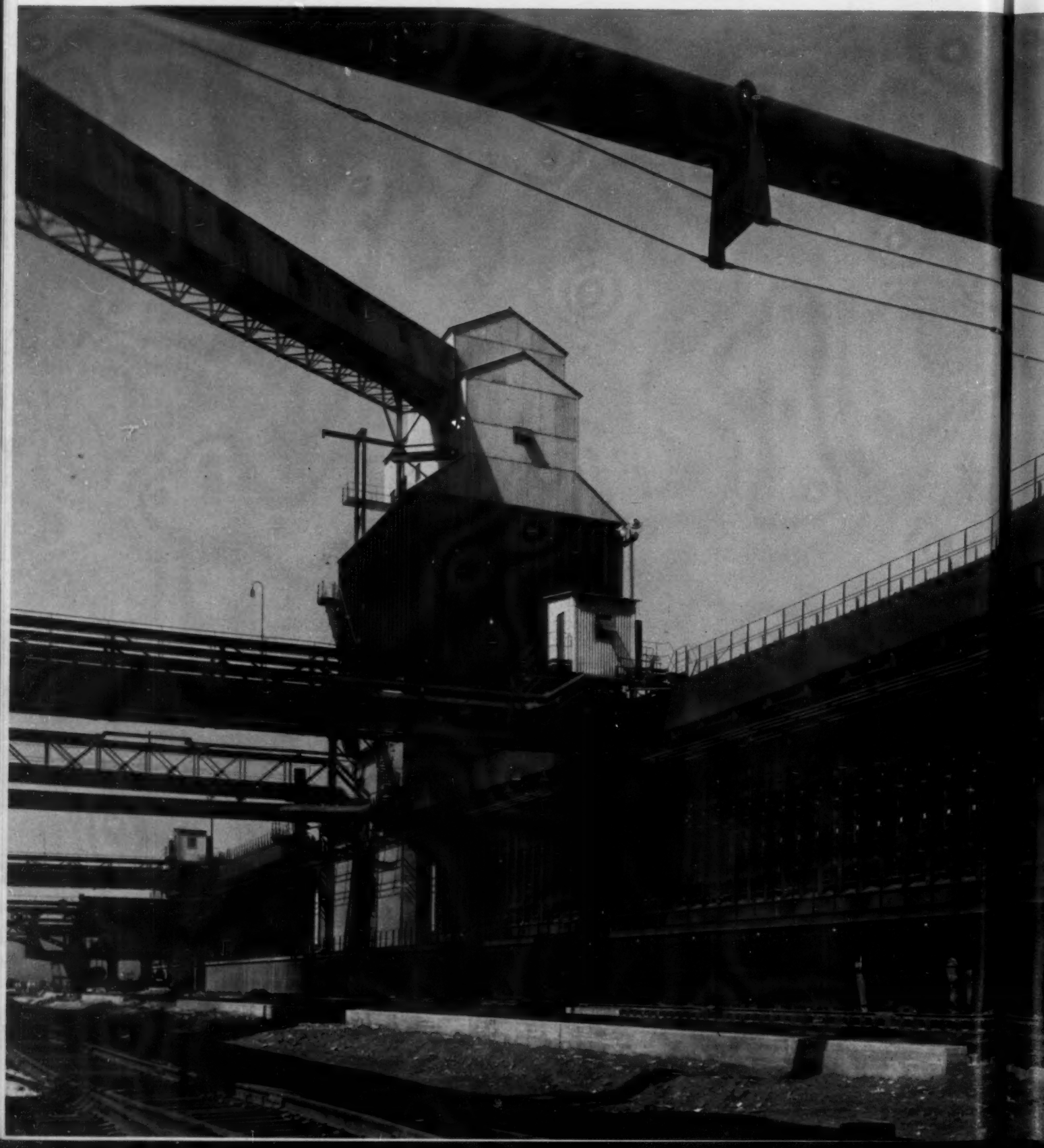
from mine to consumer

ANACONDA WIRE AND CABLE COMPANY

KOPPERS COMPLETES COKE OVEN PLANT EX



NT EXPANSION FOR WEIRTON STEEL COMPANY

TWO BATTERIES—106 NEW OVENS ADDED

Koppers has recently completed construction of two batteries totaling 106 Koppers-Becker Ovens for the Byproduct Coke Plant of Weirton Steel Company at Weirton, West Virginia.

These latest batteries are Koppers-Becker Under-Jet Ovens equipped with Waste-Gas Recirculation and Blast-Furnace Gas Underfiring equipment.

The first of these two newest batteries was put into operation on July 19, 1947, and the second was started on September 10, 1947. They are rated to carbonize approximately 2600 net tons of coal per day.

Koppers engineers designed and constructed the first battery of byproduct coke ovens operated by Weirton in 1922, and since that date, Koppers-Becker byproduct coke ovens have been used exclusively in this plant for the production of blast-furnace coke.

Since the erection of the 37 initial ovens in 1922, the following repeat orders were received:

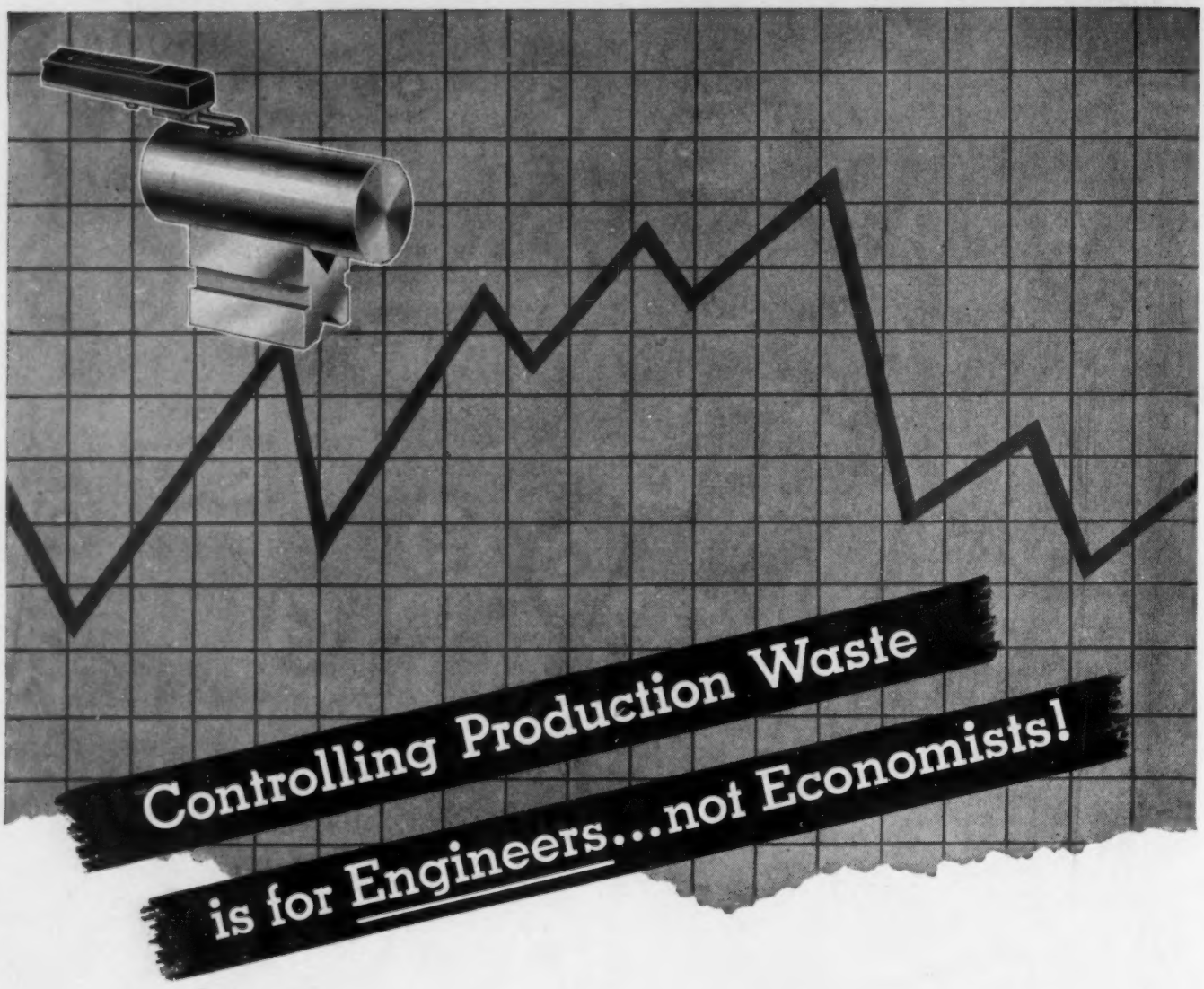
1925— 49 ovens
1929— 25 ovens
1941— 45 ovens
1946—106 ovens

The first four batteries of ovens were built in line, the fourth battery being built on a unique foundation which extended out over the river bank for a considerable distance. This foundation made it possible to build the battery in line with the other three batteries, saving the investment in much duplicate auxiliary equipment.

The two new batteries of ovens were built on a site adjacent to the older batteries.

The Koppers engineering staff specializes in the design and construction of the most advanced and efficient coal carbonization, material handling and gas treatment equipment.

KOPPERS COMPANY, INC.
KOPPERS BUILDING, PITTSBURGH, PA.



● Today when production costs are moving up and raw materials are still scarce in many industries engineers are improving measurement and control of all processes.

For surface finish measurement many engineers have turned to the Surface Analyzer*. Perhaps in your industry, too, the exact microinch analysis of surface finish is important.

The Surface Analyzer checks surface finish from less than 1 to 5000 microinches. Permanent, instantaneous direct-inking oscillograph chart record is obtained by exploring the surface with a diamond point—the motion of which is magnified and recorded on a moving paper chart. In cases where "peak and valley" chart profiles are not needed, the Brush "RMS" meter provides a constant visual check of average surface roughness. For a profile chart of an actual surface or an instant "average" reading, the Surface Analyzer is unequalled.

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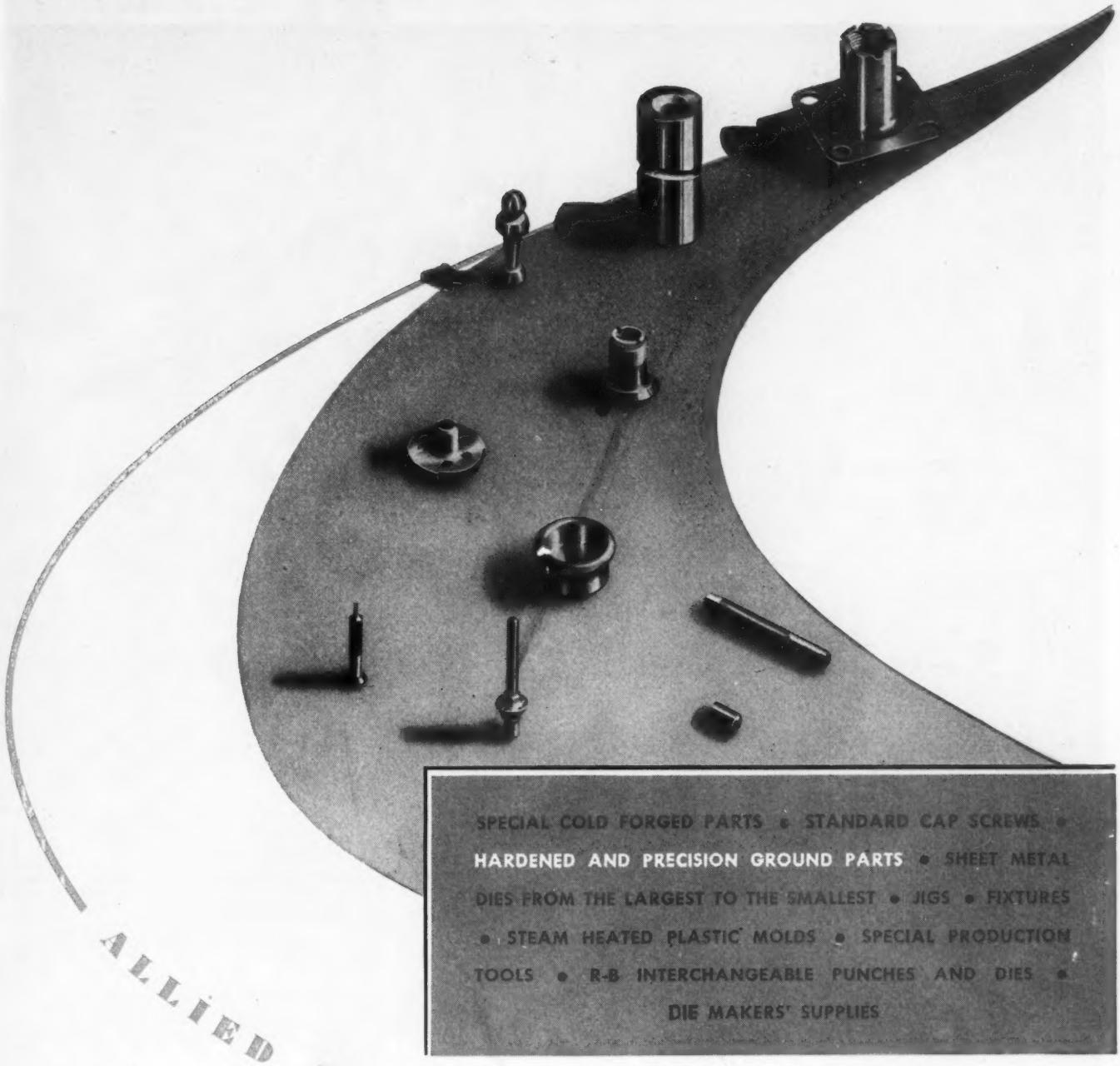

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DO YOU require quantities of hardened and precision ground parts with exceptionally fine surface finish? Allied offers the facilities and experience to produce them for you. You can expect selective hardening and accuracy in grinding to conform exactly to your specifications. Allied's manufacturing capacity assures economical, high volume production and prompt deliveries. Send us your part prints for quotations.

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FOR a good many years we have talked about how Jones speed reducers, gears and other transmission products have been built for long trouble-free service. Some people might have said that we placed too much emphasis on ruggedness, stamina and the ability of our products to "stand up and take it."

But today in every phase of production work, industry is calling for products that will measure up to these standards by continuously staying on the job.

Our Bulletin No. 80 "Jones Drives for Industry" will give you a complete outline of the range of Jones speed reducers, gears and other transmission products that are built to stand the 24-hour a day drive for maximum production. We shall be glad to mail you a copy.

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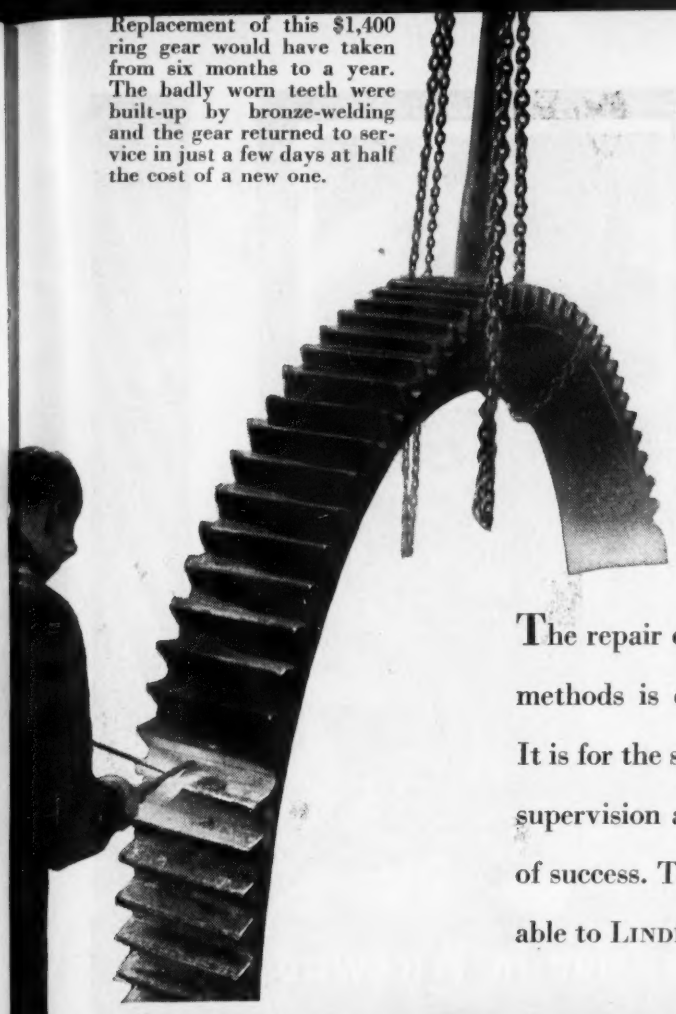
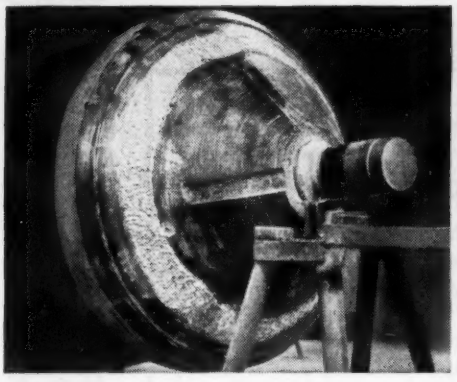
PULLEYS • GEARS • V-BELT SHEAVES • ANTI-FRICTION
PILLOW BLOCKS • FRICTION CLUTCHES • FLEXIBLE COUPLINGS



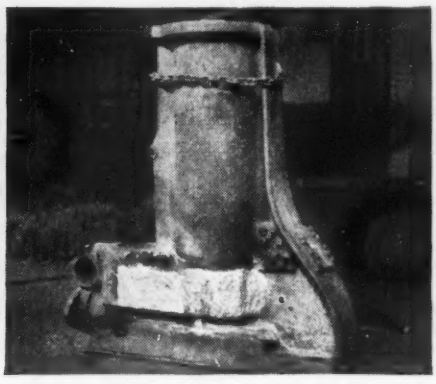
Replacement of this $1,400 ring gear would have taken from six months to a year. The badly worn teeth were built-up by bronze-welding and the gear returned to service in just a few days at half the cost of a new one.

Keeping the "wheels" going 'round

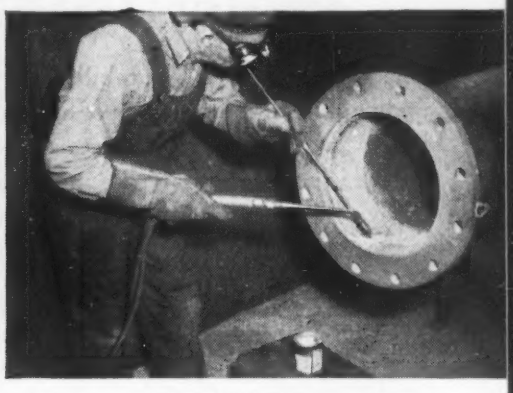
The repair of vast quantities of equipment by oxy-acetylene methods is of course routine for plant maintenance crews. It is for the special job, however, that the LINDE serviceman's supervision and work proves so valuable and gives assurance of success. This skilled, specialized assistance is always available to LINDE customers. Just phone the nearest LINDE office.



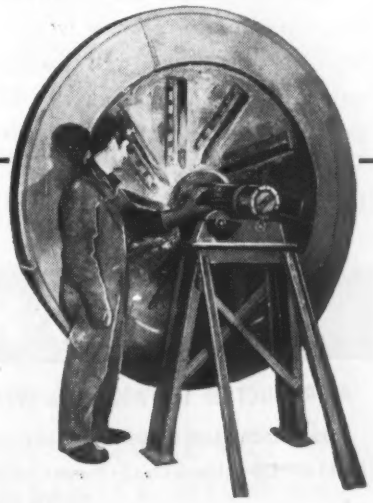
Bronze-welding this cast steel cone crusher head saved $1,000. The crack, which ran completely around the head for a distance of 9½ ft., extended through the thickness of the casting in several places. It was veed out by flame-gouging.



This cast iron steam hammer cylinder weighs 4,000 lb. Two large cracks, one on each side of the cylinder wall, were bronze-welded in only 14 hours. A new casting would have taken 16 weeks to obtain and would have cost more than 10 times as much.



Flanges are quickly joined to cast iron pipe sections by bronze-welding. LINDE supplies several bronze rods to meet varying service requirements.



Bronze-welding effected a considerable saving of cost and time when four spokes of this huge cast iron pulp-chipper wheel was cracked at the hub.

Linde

The word "Linde" is a registered trade-mark of The Linde Air Products Company.

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

30 East 42nd St., New York 17, N. Y. UCC Offices in Other Principal Cities

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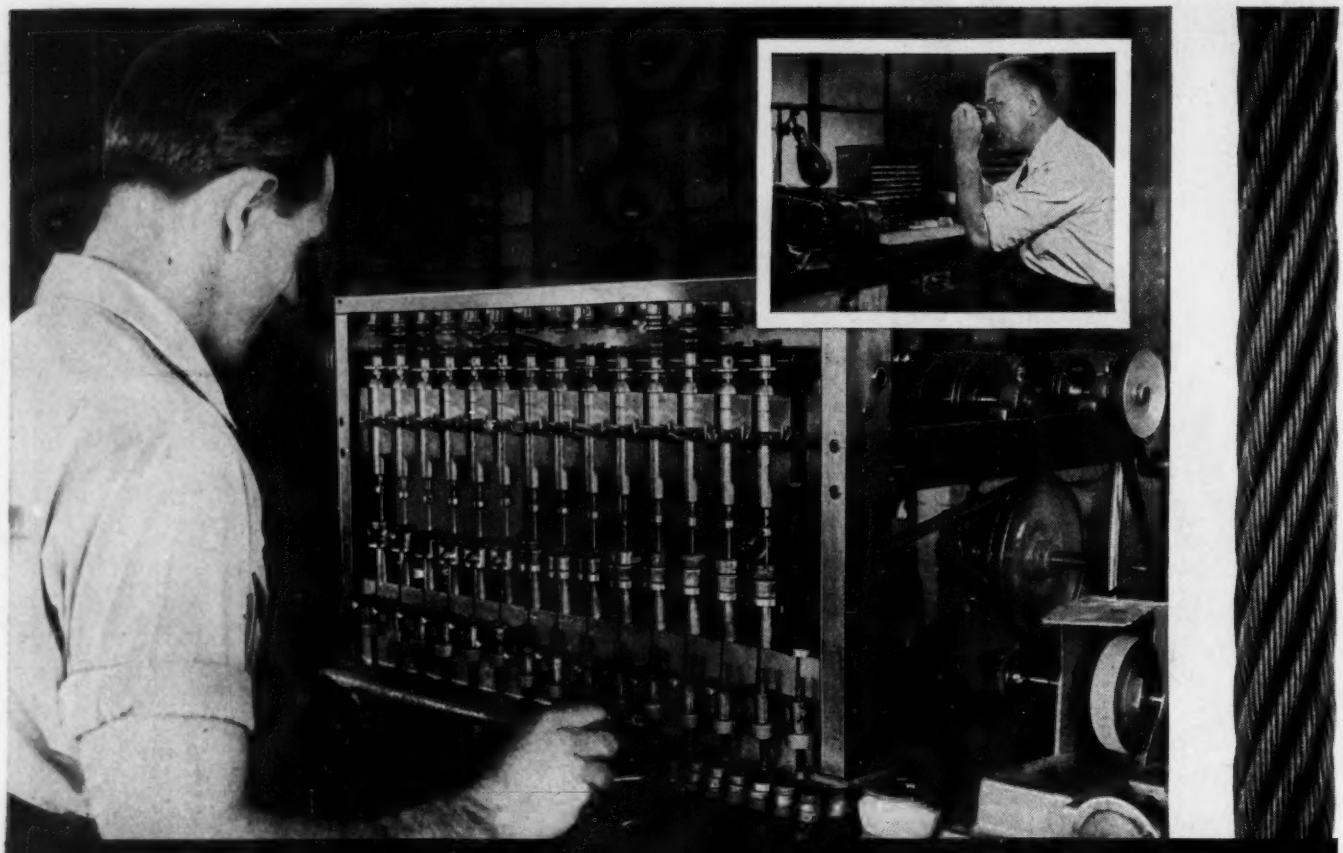

These 'Drill Masters' Develop Precision in Wickwire Rope

The workability and durability of wire rope is largely dependent upon accurate coordination of each wire in the rope. Because off-size wire can cause excessive friction and internal rope wear and early failure in service, every wire must be perfect in shape to fit into the exact geometric construction pattern of the rope.

Knowing this requirement—and knowing *how* to meet it—rests to a large extent with the men in the Die Department at Wickwire. These skilled craftsmen are perfectionists gifted with a passion for accuracy. Using special precision machines (some designed by men in the department), these patient, keen-eyed 'drill masters' create wire drawing dies drilled and ground to an accuracy within .0003 of an inch.

Such scientific precision characterizes every step in Wickwire Rope production. Small wonder then, that it is the choice of those who demand the utmost in performance, safety and long life. You can depend upon Wickwire Distributors and Rope Engineers for practical help in solving your wire rope problems. See your local Wickwire Distributor for Wickwire Rope in all sizes and constructions, both regular lay and WISSCOLAY *Pre*formed.

THIS 82-PAGE BOOK ON WIRE ROPE IS FREE. WRITE FOR YOUR COPY TODAY!

Thousands of wire rope users have found that the information packed in the pages of "Know Your Ropes" has made their work easier. It's full of suggestions on proper selection, application and usage of wire rope. It's easy-to-read and profusely illustrated. For your free copy, write —Wire Rope Sales Office, Wickwire Spencer Steel, Palmer, Mass.

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CF&I & SUBSIDIARIES

A PRODUCT OF THE WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

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Is your cut-off time too high?

try a WELLS NO. 8 with wet cutting system

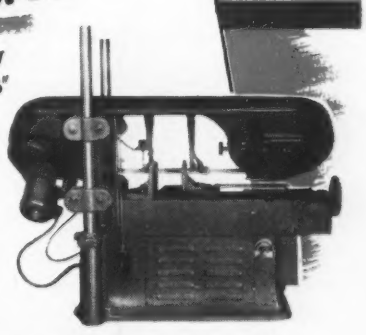
WHATEVER the job—rounds, squares, tubing or odd shapes—the Well No. 8 Metal Cutting Band Saw will hold your cut-off time to a minimum. For production or general utility this saw has the speed, accuracy and versatility to pay for itself. The wet cutting system is an economical extra that makes possible higher cutting speeds and lower operating costs. See your Wells Saw dealer or write for full details.

Specifications

CAPACITY: Rounds	8" dia.
Rectangular	8" x 16"
With special Guides	5" x 24"
SPEEDS, Selective	60, 90, 130 ft. per min.
MOTOR:	½ H.P.
WEIGHT, Approximate	750 lbs.

for HEAVY DUTY jobs the WELLS NO. 12

The Wells No. 12 is a rugged, heavy duty saw with a capacity of 12" x 16" rectangular and 12¾" O.D. rounds. It features an automatic cutting cycle and controlled blade pressure.



Wells SAWS

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METAL CUTTING BAND SAWS

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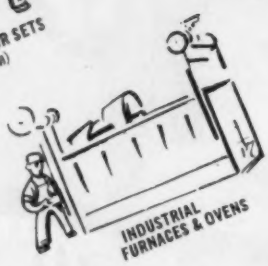

Millions of dollars' worth of industrial equipment and supplies still remain in War Assets inventories of surplus war material. Some of the equipment is unused; some of it is used. All of it is for sale at extremely attractive prices.

Are you considering the purchase of additional equipment for your plant? Before you place an order, check with the nearest WAA Customer Service Center for listings of current offerings. Among these you are likely to find exactly the item you want, at a price that will save you a substantial amount of money.

Our inventory includes: Industrial Furnaces & Ovens • Welding Equipment (Arc, Resistance & Gas) • Conveyors (All types) • Industrial Trucks (Hand & Power) • Hoists (Chain & Electric) • Foundry Equipment • Electric Generator Sets (Gasoline-Engine Driven) • Motor Starting & Control Equipment • Industrial Fans • Steam Specialties

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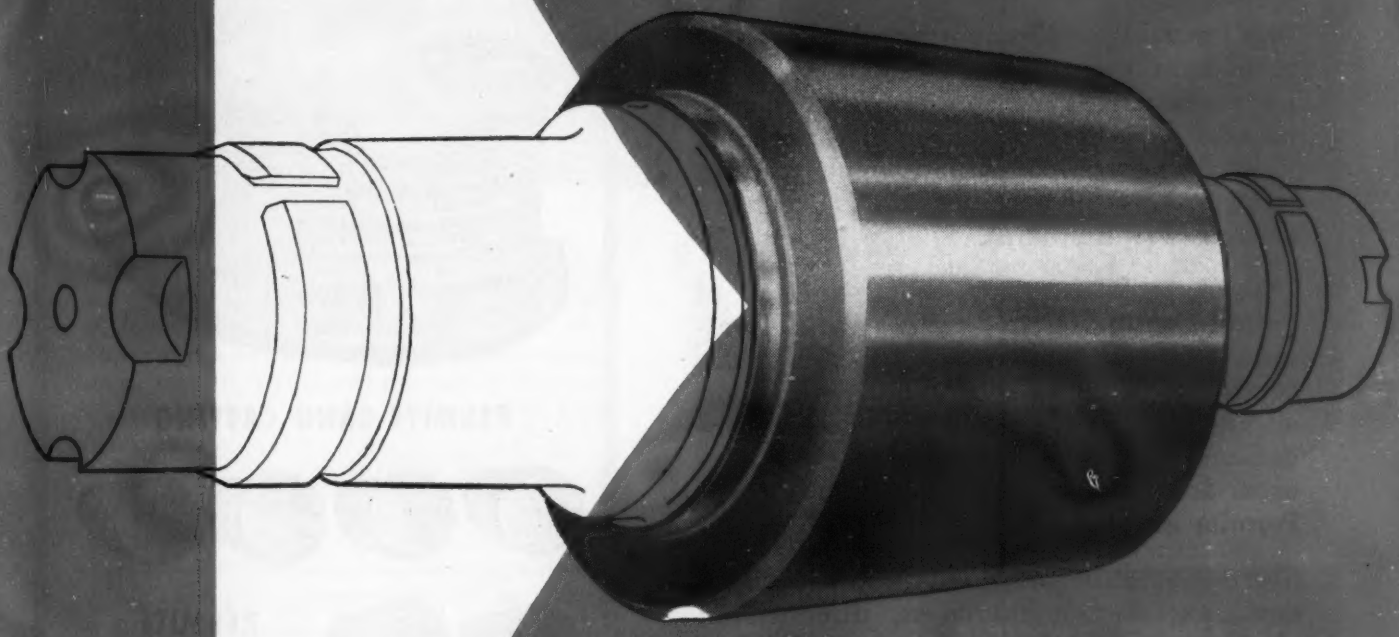
Customer Service Centers in these and many other cities

3 Main Reasons Why—

Heppenstall Sleeves

cut back-up roll costs



1. *First Cost is Lower*—Heppenstall forged-steel sleeves cost less than solid rolls and are furnished from alloy steel of our own manufacture.

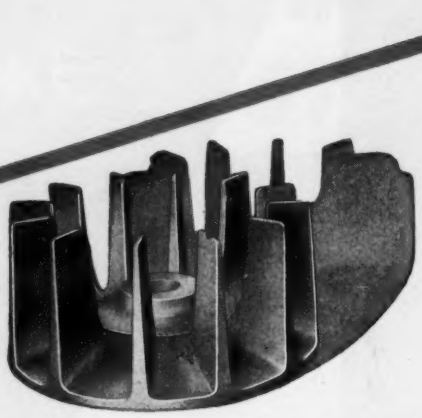
2. *They Last Longer*—Heppenstall sleeves provide working surfaces which outlast solid rolls because they are "tailor-made" and heat treated to the hardness required for any specific application.

3. *They Save Worn Rolls*—Why scrap a worn back-up roll when it can be re-sleeved several times? Heppenstall has every facility for correctly sizing your solid rolls to form arbors . . . and for perfect shrink-fitting of sleeves to arbors.

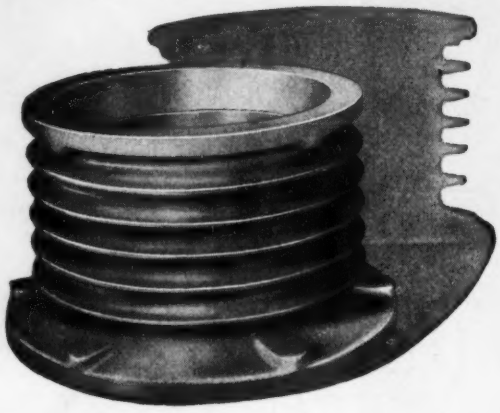
If you are interested in greater tonnage at lower cost, investigate the advantages of Heppenstall sleeves. And remember, too, that Heppenstall produces forged arbors—also "tailor-made" as to both material and strength for extra service. Write Heppenstall Company, Pittsburgh 1, Pa.

the most dependable name in forgings— **Heppenstall**

HERE'S THE ANSWER TO YOUR ALUMINUM CASTING PROBLEM



PERMITE PERMANENT MOLD CASTING



PERMITE SAND CASTING

PERMITE DIE CASTINGS

Don't puzzle needlessly over whether your aluminum castings should be made by permanent mold, sand or die casting process. Ask Permite aluminum engineers to work out the correct answer according to your particular product needs, quantity and cost requirements.

The quarter-century of experience of Permite engineers in working with aluminum alloy castings will be placed at the service of your own design and production engineers and cost estimators. Recommendations will be unbiased, as all three processes are used in the modernly equipped Permite aluminum foundries.

Shape of the part, whether simple or complex, section thickness, dimensional accuracy required, necessary mechanical properties, surface finish desired, number of castings needed, production rate expected, approximate cost ratios — these are some of the important factors studied in determining casting methods.

Choice of the right type of aluminum castings can make a big difference in the production rate and cost of your product. So put the problem up to us. Don't hesitate to tell us about your parts requirements and to ask for recommendations and cost estimates.

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CINCINNATI 25, OHIO

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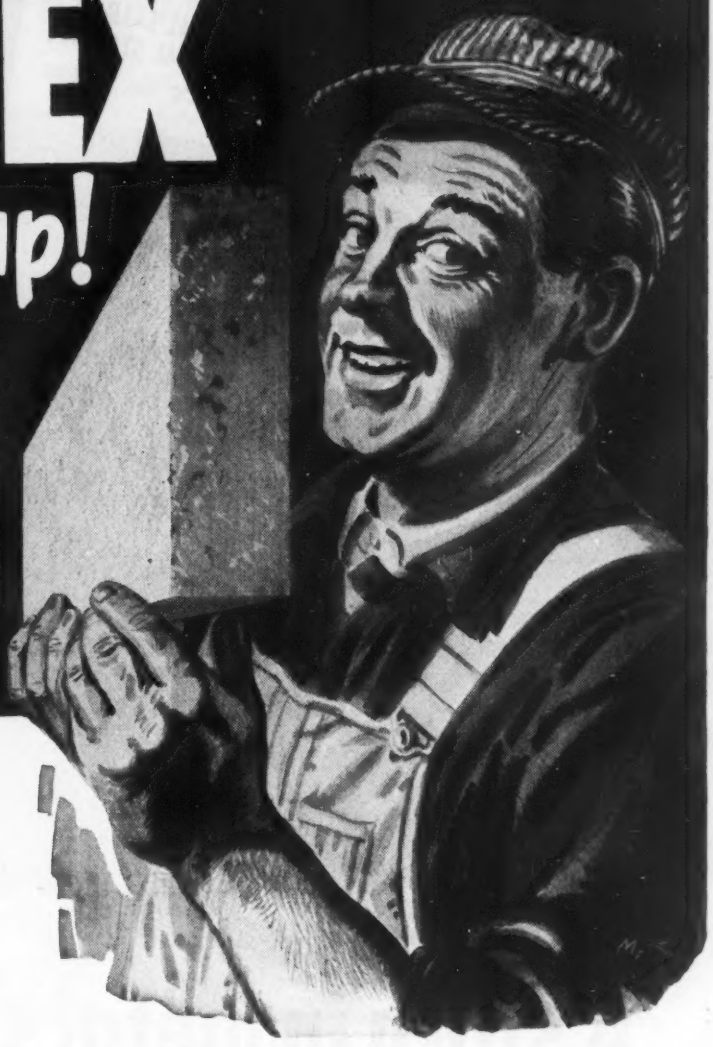
"SUPEREX sure stands up!

...You can take my word for it. I've used it behind refractory linings for over 20 years!"



SO SAY steel men everywhere. Oil men, too—in fact, practically everyone who handles high temperature equipment. You can't beat Superex as a block insulation for temperatures up to 1900 F. That's why it's behind more refractory linings than any other block type insulation.

These seven reasons give the Superex story in a nutshell:

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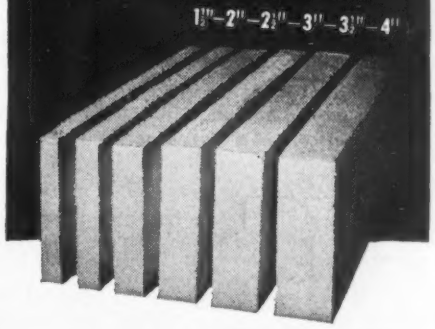

JOHNS-MANVILLE *First in* INSULATIONS

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A stitch in metal saves *plenty!*

STITCHING with wire is a relatively new way of joining metal to metal, or metal to almost any other material. Since speeds up to 100 stitches a minute are possible . . . and since wire is economical . . . there are tremendous time-and-cost savings compared with other methods of fabrication.

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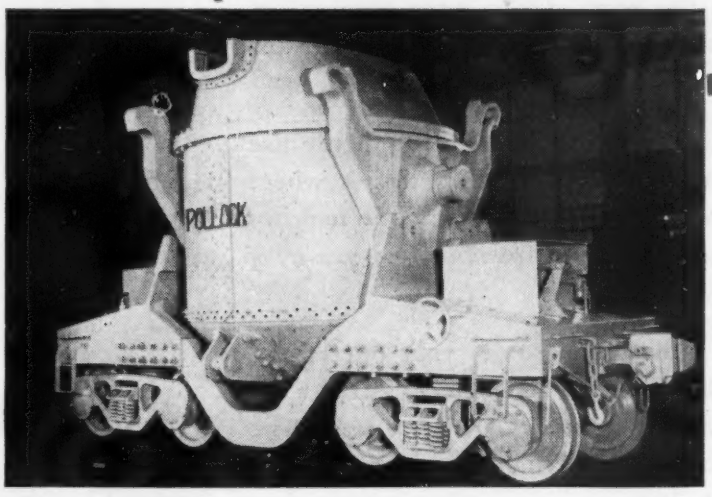

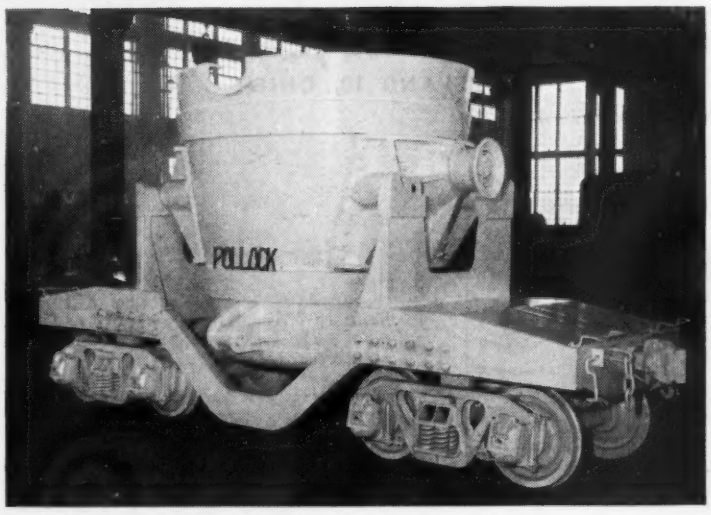

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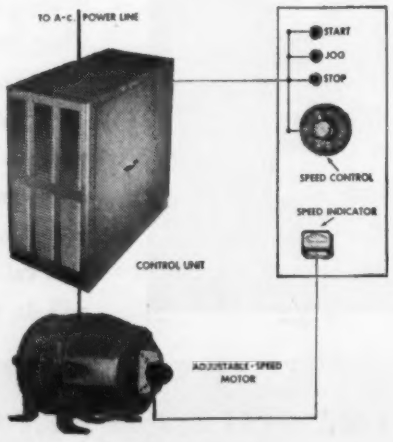

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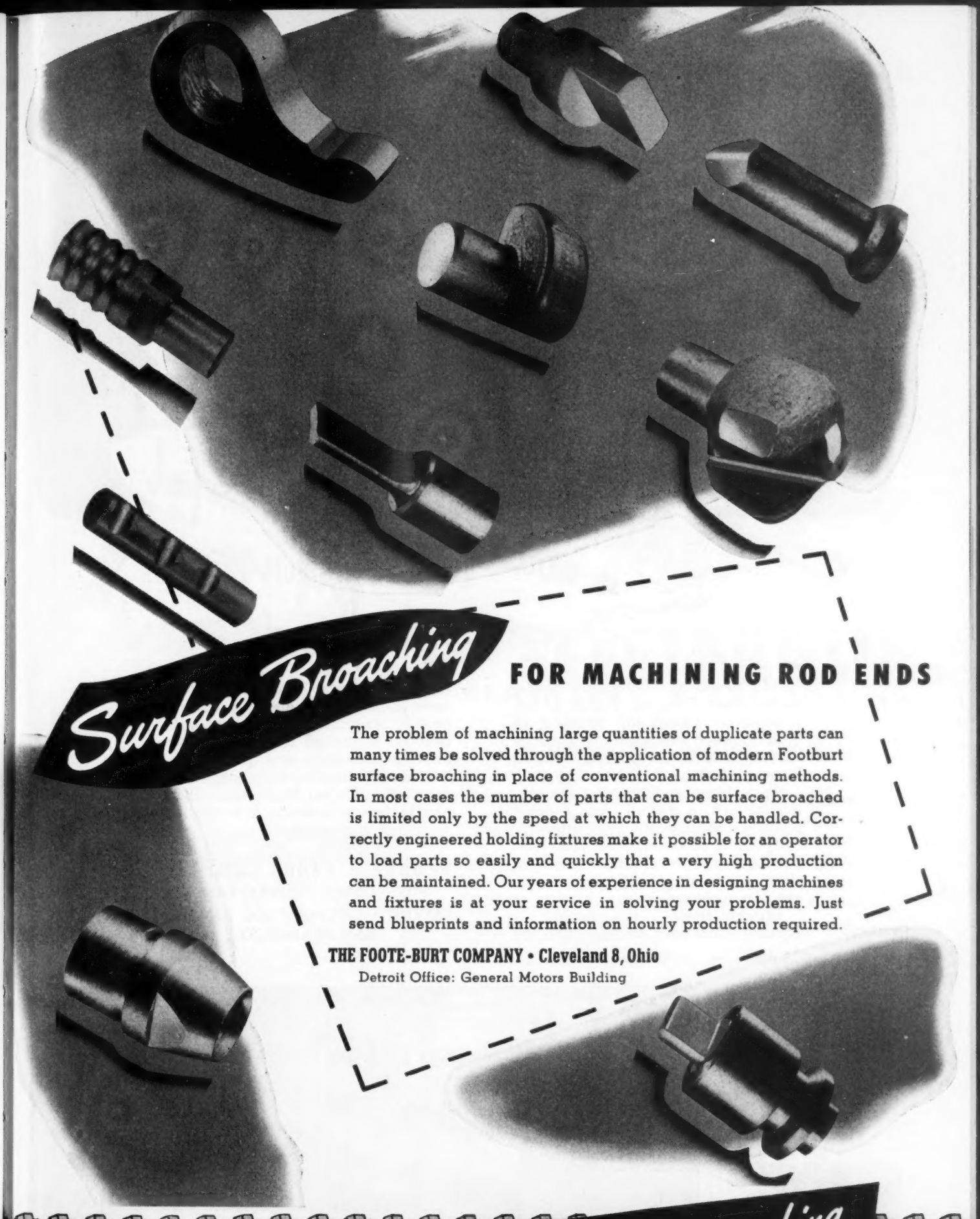

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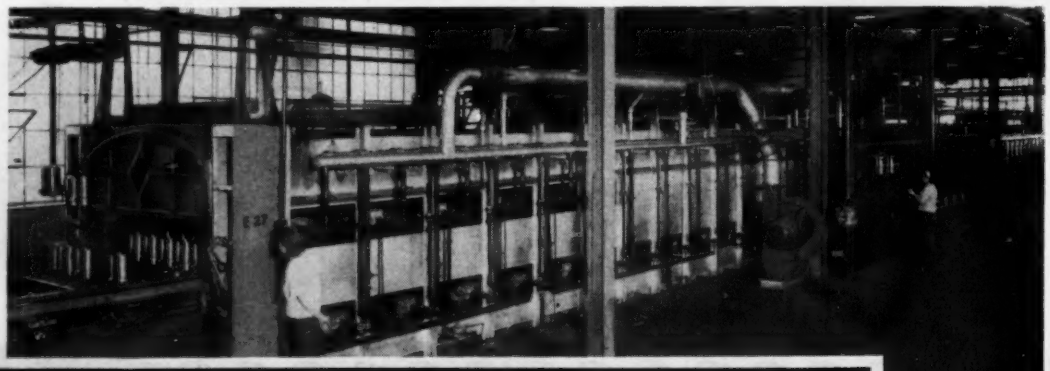

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...made of Republic Enduro

Now, whatever your requirements for stainless steel tubing, you'll find the answer in ELECTRUNITE Tubing made of time-tested Republic ENDURO.

In addition to the many standard tubing sizes, ELECTRUNITE *is available* in a range of much-in-demand Standard and "Schedule 10" pipe sizes—made by the same superior forming and welding process which distinguishes all ELECTRUNITE Stainless Steel Tubing.

Complete information is available upon request. Call your nearest Steel and Tubes district office, or write for full details.

STAINLESS STEEL MECHANICAL AND PRESSURE TUBING

These are common sizes. A limited number of other sizes can be made by welding direct to size, and intermediate sizes can be made by cold drawing. Wall thicknesses heavier than those shown may be obtained in most sizes. Many geometric shapes other than round can be supplied with limits of a 9½" periphery.

OUTSIDE DIAMETER	GAUGE RANGE	OUTSIDE DIAMETER	GAUGE RANGE
⅜"	16-22	1½"	10-20
7/16"	16-22	1⅝"	10-20
½"	14-22	1¾"	10-20
⅝"	14-21	1⅞"	10-20
11/16"	14-21	2"	9-20
¾"	13-20	2⅛"	9-20
⅞"	12-20	2¼"	9-20
1"	11-20	2⅜"	8-20
1 1/16"	11-20	2½"	8-20
1⅛"	11-20	2⅝"	8-18
1¼"	11-20	2¾"	8-18
1 5/16"	11-20	2⅞"	8-18
1⅜"	11-20	3"	8-18

The above sizes are available in types 304, 309S, 310, 316, 317, 347, 430 and 446.
Type 302 is available in a limited range of sizes for ornamental use only.

STAINLESS STEEL PIPE

NOMINAL PIPE SIZE	OUTSIDE DIAMETER	SCHEDULE 40 STANDARD PIPE WALL THICKNESS	SCHEDULE 10 LIGHT WALL PIPE WALL THICKNESS
⅛"	.405	.068	.049
¼"	.540	.088	.065
⅜"	.675	.091	.065
½"	.840	.109	.083
¾"	1.050	.113	.083
1"	1.315	.133	.109
1¼"	1.660	.140	.109
1½"	1.900	.145	.109
2"	2.375	.154	.109

The above Pipe Sizes are available in the Chrome-Nickel analyses of Enduro Stainless Steel.

REPUBLIC STEEL CORPORATION
STEEL AND TUBES DIVISION • CLEVELAND 8, OHIO
Export Dept.: Chrysler Bldg., New York 17, N.Y.

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Even if used under pressures severe enough to burst the tubing, PARKER *3-Piece* Tube Fittings remain intact . . . and do not leak or distort. Pictured is just one sample from thousands of tests that have been made—all with the same leakproof performance result.

PARKER Tube Fittings control vibration better. They're easy to assemble . . . may be reassembled repeatedly. Shapes are machined from high-strength forgings. Offered in the widest range of shapes and sizes in brass, steel, stainless steel—and aluminum. Two styles—*3-Piece* flare-type and flareless Ferulok. Warehouse stocks conveniently located in all major industrial centers.

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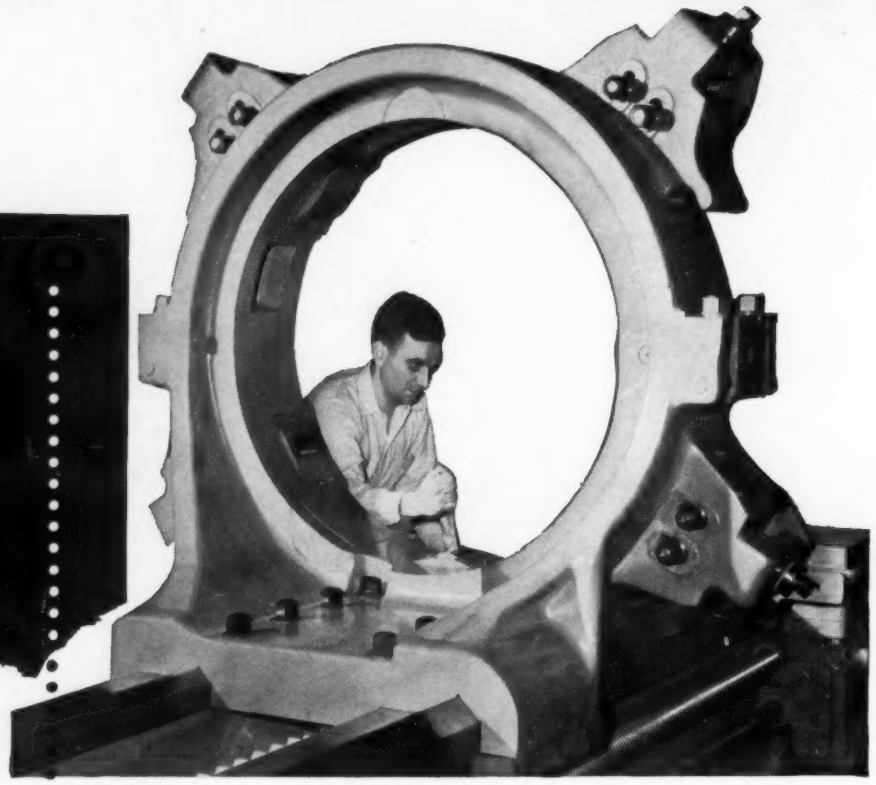

How do you handle machining of outsize, irregular parts?

Here's a way that may save you time . . . and money. Hold the part in a fixture or cradle, and turn it on a Monarch; you'll get peak production *at a profit.*

For example, for one customer we've raised a 32″ x 180″ Model NN Engine Lathe in the sand, to swing 48″ over the bed and 36½″ over the cross slide, as illustrated. There's ample power for the turning and boring operations, yet no idle investment in ponderous, unused capacity. The antifriction, steady rest provides 36″ to 38½″ capacity—more than enough to handle a variety of jigs and fixtures. The result is a simple solution to this customer's bothersome production problem. May we help you, too?

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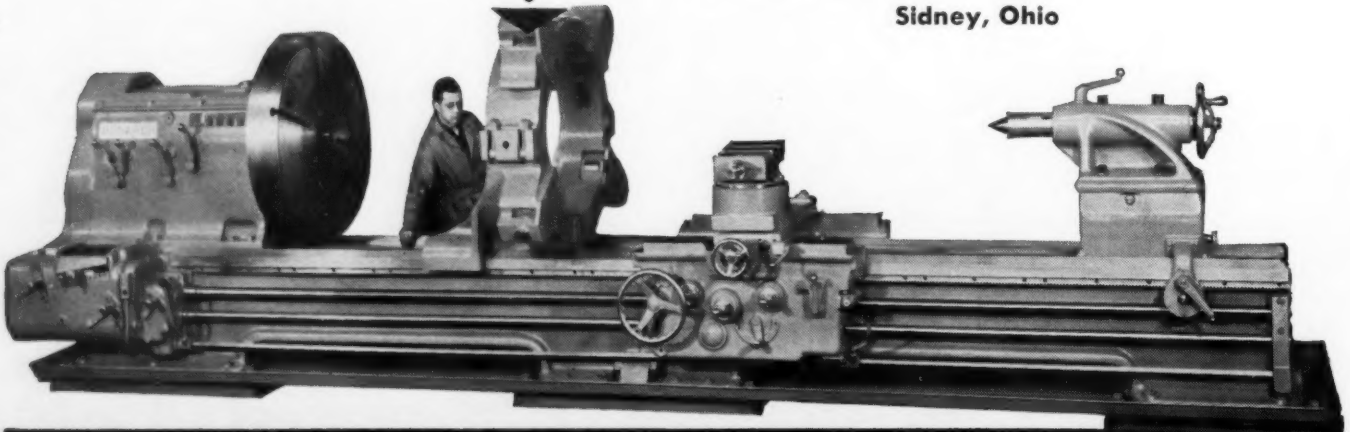
Monarch
TURNING MACHINES

THE MONARCH MACHINE TOOL CO.
Sidney, Ohio



FOR A GOOD TURN *FASTER*—TURN TO MONARCH

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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 121, NO. 20 NOVEMBER 17, 1947

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with the help of...

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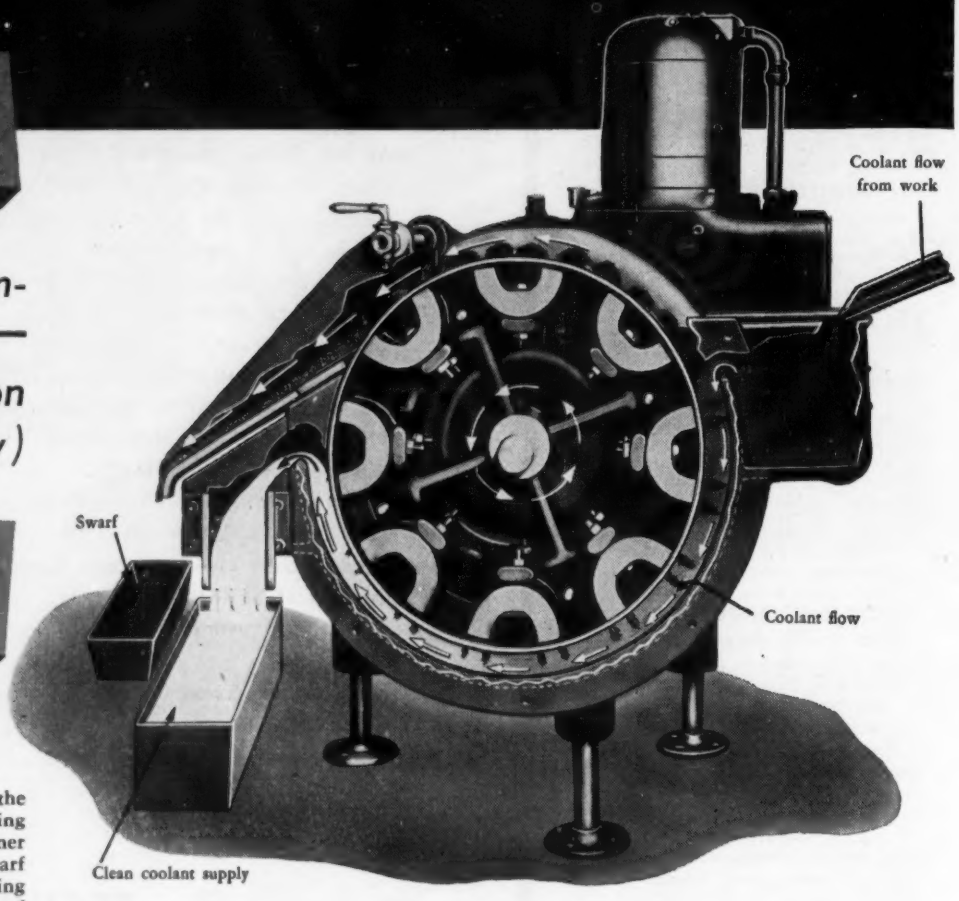
(Aluminum-NICKEL—Cobalt—Iron Alloy)



BARNESDRIL AUTOMATIC MAGNETIC COOLANT SEPARATOR . . . pictured to show operation. Coolant from the work flows, as pictured, around a revolving drum that carries Alnico magnets on its inner face. On its outer face, the magnetic swarf fastens endwise over each magnet. Traveling with the drum toward a scraper, the swarf fine-combs most of the other entrained non-magnetic particles from the coolant. Standard sizes handle 5, 10, 20, 40 or 100 gal. per min.

Here's an open view of a separator that completely frees machine operators from the task of keeping coolants clean.

Fully automatic, this type reclaims as much as 100 gallons of oil per minute.

Developed and produced by Barnes Drill Co. of Rockford, Ill., the equipment incorporates a series of Alnico permanent magnets containing 20 per cent Nickel, which contribute fundamentally to the unique efficiency of this separator.

The exceptionally high magnetic properties of Alnico, an aluminum-Nickel-cobalt-iron alloy, permit designs that were technically impossible with older materials. Compared with the latter, Alnico reduces space and weight requirements to practical limits.

Nickel, an essential element in Alnico, also improves hundreds of other alloys for applications in the machine tool industry.

We invite consultation on the use of Nickel or Nickel alloys in your products or equipment.

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THE INTERNATIONAL NICKEL COMPANY, INC.

67 WALL STREET
NEW YORK 5, N. Y.

November 17, 1947

Who Needs Scrap?

No industrialist can read the Harriman committee report on foreign aid without feeling grateful to its authors for their realistic conclusions in regard to the export of certain critical materials.

A case in point is iron and steel scrap. The Committee for European Economic Co-operation, representing the 16 nations to benefit by the Marshall plan, has asked for scrap in amounts ranging from 1.7 million tons in 1948 up to 2.5 million tons in 1951. The Harriman committee believes that European scrap supplies are larger than assumed by CEEC. Therefore, it recommends that no scrap be exported.

The scrap problem is vitally important. Much of the success of the American industrial machine is due to the cycle whereby scrap resulting from production, fabrication, manufacture and obsolescence returns to the furnaces, thereby conserving ore and fuel. Too few people realize how badly this cycle was impaired during the war. According to the Harriman committee report, this nation lost 123,800,000 net tons of potential scrap through wartime exports. This is about equivalent to the total consumption of purchased scrap during the five years of highest steel output!

This explains why we are having so much difficulty in restoring the normal scrap cycle. It also explains why we cannot obtain enough scrap currently to maintain steel ingot production at existing capacity. It constitutes an irrefutable argument against supplying scrap for Europe under the Marshall Plan as long as present scarcities exist.

The Harriman committee recommends that European nations seek to meet their scrap needs from sources other than the United States. We propose an amendment. We suggest that Europe get busy recovering her substantial tonnages of scrap and that the excesses above her immediate requirements be offered to the United States as a partial payment or as a premium for finished steel, equipment and supplies that we can furnish under the Marshall Plan.

We have seen sufficient tonnages of scrap in Europe and Asia to be convinced that with ruthless cutting of red tape and under attractive incentives, more scrap can be procured from these areas than has been estimated by some experts. The more scrap we can get now, the better we can carry out the major objectives of the Marshall Plan.

* * *

RECORD STEEL OUTPUT: In October production of steel ingots and steel for castings totaled 7,564,302 net tons. This is the greatest output ever achieved by American steelmakers in any peacetime month. It was exceeded in only 10 of the 45 months of World War II and it falls short only 261,955 tons of the record wartime and alltime monthly output of 7,826,257 net tons in March, 1944.

The industry operated at 97.6 per cent of capacity in October. During the first 10 months of 1947, production totaled 70,188,837 tons. November and December are shorter working months than October, but if the October rate can be maintained, steel ingot production for the year will crowd the 85 million ton mark.

Considering the shortages and other difficulties which plague steelmakers, this is a remarkable record. Unfortunately, justifiable pride in the achievement must be tempered by a realization that this noteworthy output has not eased the supply situation in regard to tight steel products such as sheet and strip. Although output of flat-rolled products in 1947

(OVER)

will exceed that of 1946 by about 27 per cent, mill order backlogs at the year-end will be as large as ever.

With relief not yet in sight, consumers must base their hopes on continued high output and early completion of additional facilities.

—pp. 61, 63, 147

* * *

HIGH BUILDING COSTS: Overdue attention is being paid to arbitrary practices which increase the cost of building construction unnecessarily. A congressional committee is studying unreasonable code requirements, featherbedding and other restrictive factors in a number of key cities.

At the 25th annual convention of the American Institute of Steel Construction, President T. R. Mullen declared that stabilization of costs in the building industry is not yet in sight. This is due largely to the fact wages continue to mount, labor productivity is down nearly 50 per cent from the level of four years ago and some unions are reluctant to increase their membership, resulting in terrific costs for overtime.

One glimmer of hope is sighted in the agreement signed by Lustron Corp. and the American Federation of Labor which provides that only three crafts will be engaged in the construction and erection of Lustron prefabricated homes. This may spell real progress. —pp. 63, 65

* * *

VISION PROGRAMS PAY: One wonders how many executives in the metalworking industries appreciate importance of good vision and the extent to which a systematic program on vision can increase efficiency and improve employee morale.

The problem is particularly pertinent in metalworking operations. About one-third of the accidents in the average plant result in eye injuries and three out of five industrial eye accidents occur among metalworkers.

A good vision program involves more than the standard Snellen test. It embraces analysis to determine the visual requirements for each job and examination of the sight qualifications of each employee so that man and job can be matched. It calls for checks to detect those who need visual care. Most visual handicaps can be corrected. War Production Board found that productivity was increased by 15 to 25 per cent in plants where employees were given scientific vision care. —p. 96

SIGNS OF THE TIMES: In spite of the hysterical protests raised by numerous union labor leaders against provisions of the Taft-Hartley Act calling for the filing of affidavits stating that officials of unions are not communists, National Labor Relations Board at the close of business on Oct. 31 had on file 19,306 affidavits (p. 72)—13,320 from AFL officers, 5378 from the officers of independent unions and 608 from CIO officers. . . . Of the 90 automobiles exhibited at the thirty-fourth automobile show held at the Grand Palais in Paris in October (p. 75), 25 were British, 21 American, 8 Italian and 2 Czechoslovakian. French models ranged from a small, two-seater Rovin priced at $730 to a Delahaye luxury model bearing a price tag in francs equivalent to $33,000. . . . According to David E. Lilienthal, chairman of the United States Atomic Energy Commission, the atomic power plant as a commercially practical unit is not "just around the corner, nor around two corners." Mr. Lilienthal believes (p. 102) that it may take 10 or 100 years, depending upon the rate of progress in solving certain technical problems, to harness atomic power for everyday use. . . . Three important price indices of the Bureau of Labor Statistics declined fractionally in the week ended Nov. 1. Index of wholesale prices for all commodities was down 0.6 from the previous week (p. 82), that of industrial raw materials was off 1.1 and that of manufactured products dipped 0.6. . . . On order or in service are more than 2000 railroad freight cars equipped with antifriction bearings (p. 90) and about the same number of cars similarly equipped are in service or on order for steel companies, iron mines, limestone quarries and other heavy transportation needs. . . . The development cost of airplanes now ranges from $146 to $320 per lb, depending upon size, design and weight of plane. These figures (p. 74) apply to planes ranging in weight from 25,000 to 184,000 lbs. . . . Profits of automobile builders, which look good when expressed in dollar volume (p. 77), are below prewar levels when calculated in percentage of net sales. It is significant that several motor car manufacturers are making substantial increases in reserves for depreciation and obsolescence as a partial offset to sharply increased costs of replacement.

E. L. Shaner

EDITOR-IN-CHIEF

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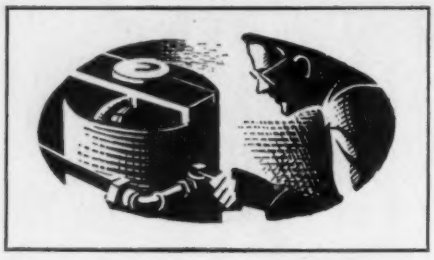
HOW TO GET . . . .

Exact Mechanical Properties in Alloy Steel from Stock



Most steel buyers are accustomed to specifying alloys on the basis of analysis alone. But there's a better, surer way of buying that's gaining more followers daily—specification of Ryerson alloys by analysis *and* minimum hardenability requirement. Either one alone isn't enough. Together they give double assurance that your steel will measure up to performance demands.

You can order this way from Ryerson because we test every heat of annealed and as-rolled alloy in stock. Establish the heat treatment response for every shipment by end-quench hardenability tests. Then, when you specify the mechanical properties you must have after heat treating, we select bars that, on the basis of actual tests, will do the job.

This system of purchasing can effect important savings for your company. It protects against expensive product failure and practically eliminates the possible necessity of replacing unsuitable material. Ryerson assures delivery of alloy steel that will amply meet your minimum hardenability requirements.

And to prove that you can get the desired performance, we send a Ryerson Alloy Report with every shipment. Charted test results and mechanical properties interpreted from them confirm the steel's hardenability and guide you in obtaining the desired heat treatment results.

Hardenability is nothing new with Ryerson. It's been a Ryerson service for ten years now. If you have yet to order on this basis why not investigate the advantages? Thousands of tons of tested Ryerson alloys are awaiting your call.

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RYERSON STEEL

Renovation of this dock on the Black River at Lorain, O., where iron ore arrives from Minnesota, is one of the improvements in the $100 million modernization program of U. S. Steel's National Tube Co. Lorain program includes a new coke plant, a continuous seamless pipe mill, blooming, bar and billet mills and a new bessemer plant

Sheet Shortage Crimps Metalworking

Durable goods manufacturers still unable to obtain sufficient metal to support full operation of plants despite record-breaking production and enlarged rolling facilities. Stringency as acute as at any time since war's end

MANUFACTURERS of consumer durable goods made of sheet and strip steel appear little better off today in the matter of steel supply than they were months ago when the promise was held out to them of likely supply-demand balance being struck in these products by yearend.

View in steel sales circles today, a little more than a month from the year's end, is that the stringency in sheet and strip supply is as acute as at any time since the end of the war over two years ago. This, despite the fact rolling capacity has been substantially increased over the past year, and output of the flat-rolled products has been at a record-breaking rate.

Based on production to date this year some steel industry authorities expect production of sheet and strip in 1947 will total somewhere around 18 million tons. Based on actual deliveries of hot and cold-rolled sheets and strip, galvanized and enameling and electrical sheets through September this year, 1947 shipments of these products will total 17,974,400 net tons. Shipments in all of last year totaled only 14,140,198 net tons. Thus, a net gain of 27.1 per cent is indicated for this year.

Comparative shipments of the respective flat-rolled products, 1947 estimated, are as follows:

Product	1947*	1946	Per Cent of gain in 1947
H.R. sheets.	7,131,952	5,521,463	29.2
C.R. sheets.	5,352,039	4,075,554	31.3
Galv. sheets.	1,589,203	1,462,053	8.7
Elec. & Enam. ...	572,731	435,170	31.6
H.R. strip ..	1,727,022	1,363,812	26.6
C.R. strip ..	1,601,462	1,282,146	24.9
Totals ...	17,974,400	14,140,198	27.1

* Last three months of the year estimated.

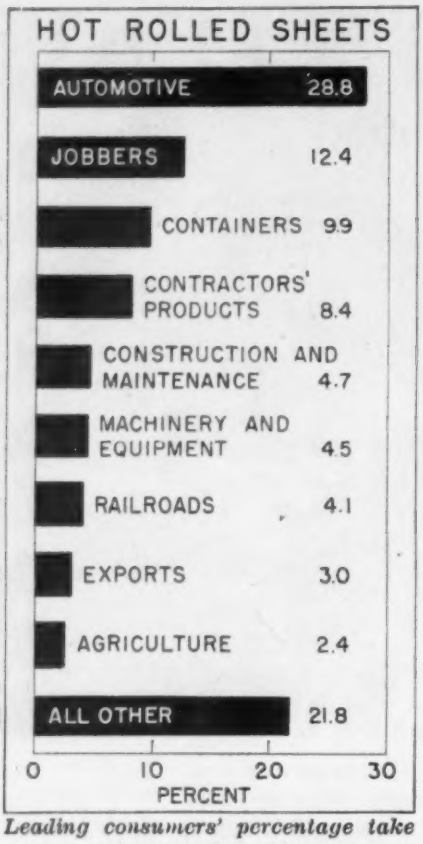
The substantial increase in production indicated for this year has not resulted in a decline in mill order backlogs. In fact, despite efforts of producers to bring their books into balance in the closing months of the year indications now are they will enter the first quarter of 1948 with considerable carryover tonnage from fourth quarter of this year.

Even though record-breaking operations are maintained through December it appears highly unlikely this prospective carryover will be materially reduced between now and the end of the year, and as things now stand, it looks as though considerable first quarter rollings will be devoted to taking care of the slop-over. This, of course, means new bookings for first quarter shipment will be limited.

At the moment it is understood

WANTS EXPANSION

Recommendation that President Truman call representatives of industry, labor and government together to draw up a joint program of steel expansion was made last week to the President's Council of Economic Advisers by Otis Brubaker, research director, United Steelworkers of America.

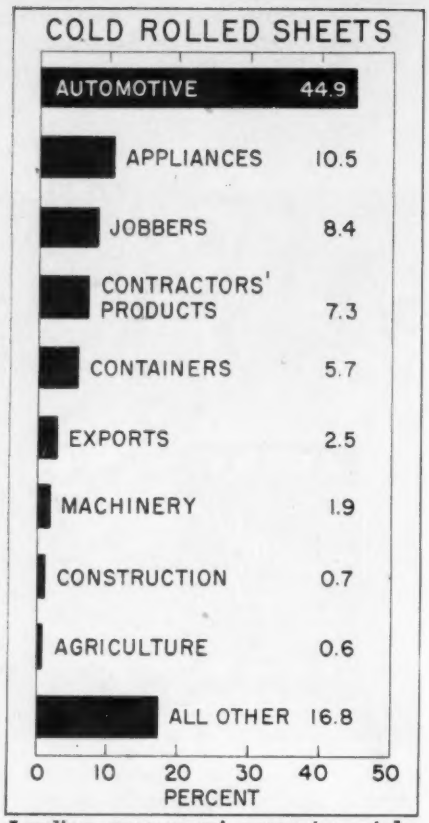


Leading consumers' percentage take of estimated 1947 shipments

some producers are "blocking" out several weeks' rolling schedules in January and February to care for the carryover tonnage. This means, of course, new bookings for shipment in the first quarter will be cut down by just that much.

Outlook for substantial improvement in conditions over the first half of next year is not promising. Producers expect flat-rolled supply will be tight all through the year though gradual easing in the situation is anticipated as new rolling capacity, now in construction, comes into operation. Projected construction of 3 million tons of additional rolling capacity had been scheduled for completion by July of this year, but only about 1 million tons of the projected new capacity was completed.

Some time next year indications are capacity will be sufficient to turn out somewhere around 20 million tons of flat-rolled products. Whether the producers will be able to turn out tonnage at capacity rate over coming months, however, depends in considerable measure on supply of semi-finished steel.



Leading consumers' percentage take of estimated 1947 shipments

SHIPMENTS OF STEEL PRODUCTS IN SEPTEMBER AND YEAR TO DATE

Steel Products	Number of companies	Items	SEPTEMBER - 1947			To Date This Year			Whole Year 1946		
			Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	41	1	280,169	5.5	153,990	2,219,393	4.8	1,580,120	1,949,624	4.0	1,645,748
Structural shapes (heavy)	13	2	359,514	7.0	428	3,313,849	7.1	2,392	3,474,284	7.1	5,399
Steel piling	4	3	24,494	0.5	-	240,296	0.5	23	205,313	0.4	141
Plates (sheared and universal)	29	4	494,701	9.7	18,089	4,652,331	10.0	164,439	4,152,181	8.5	250,709
Skelp	7	5	19,239	0.3	35,631	129,049	0.3	290,492	227,033	0.5	194,666
Rails—Standard (over 60 lbs.)	4	6	166,924	3.3	203	1,633,202	3.5	865	1,790,311	3.7	4,890
—All other	5	7	15,567	0.3	-	151,713	0.3	267	144,999	0.3	426
Joint bars	7	8	14,088	0.3	1,503	135,184	0.3	11,752	176,803	0.4	5,327
Tie plates	9	9	41,834	0.8	62	380,907	0.8	3,743	447,496	0.9	18,700
Track spikes	8	10	11,748	0.2	-	127,144	0.3	74	146,194	0.3	693
Hot Rolled Bars—Carbon	34	11	483,991	9.4	45,814	* 4,677,503	10.0	347,619	5,006,859	10.3	707,991
—Reinforcing—New billet	16	12	109,081	2.1	901	947,249	2.0	7,421	1,048,483	2.1	7,381
—Rerolled	11	13	14,692	0.3	-	121,779	0.3	-	141,346	0.3	1,267
—Alloy	27	14	136,735	2.7	15,362	* 1,310,778	2.8	159,774	1,390,278	2.8	138,395
—Total	45	15	744,499	14.5	62,077	* 7,057,309	15.1	714,814	7,586,966	15.5	855,034
Cold Finished Bars—Carbon	29	16	107,463	2.1	717	1,110,469	2.4	6,848	1,316,579	2.7	2,428
—Alloy	26	17	14,909	0.3	256	* 172,685	0.4	1,663	196,237	0.4	1,725
—Total	35	18	122,372	2.4	973	* 1,283,152	2.8	8,511	1,512,816	3.1	4,153
Tool steel bars	19	19	6,270	0.1	140	68,067	0.1	1,163	96,020	0.2	371
Pipe & Tubes—Butt weld	15	20	138,271	2.7	5,531	1,246,890	2.7	50,117	1,276,289	2.6	45,393
—Lap weld	8	21	30,958	0.6	51	295,698	0.6	752	305,516	0.6	238
—Electric weld	11	22	96,826	1.9	571	796,527	1.7	1,685	674,459	1.4	591
—Seamless	10	23	162,565	3.2	10,389	1,535,472	3.3	102,535	1,871,540	3.8	83,441
—Conduit	7	24	13,536	0.3	677	111,604	0.2	6,218	98,521	0.2	2,448
—Mechanical and pressure tubing	13	25	55,273	1.1	1,739	488,719	1.0	15,383	429,180	0.9	3,478
Wire rods	22	26	61,705	1.2	29,555	497,989	1.1	246,614	679,998	1.4	346,506
Wire—Drawn	39	27	220,008	4.3	13,968	* 1,895,992	4.1	* 133,983	1,933,124	4.0	135,592
—Nails and staples	18	28	62,498	1.2	948	606,557	1.3	6,469	636,632	1.3	797
—Barbed and twisted	15	29	21,519	0.4	9	186,891	0.4	67	207,610	0.4	-
—Woven wire fence	13	30	34,179	0.7	330	304,902	0.7	2,791	383,230	0.8	-
—Bale ties	12	31	9,752	0.2	-	90,830	0.2	-	99,993	0.2	-
Black Plate—Ordinary	9	32	59,774	1.1	121	601,121	1.3	1,853	781,167	1.6	3,179
—Chemically treated	8	33	718	-	-	17,119	-	-	125,170	0.3	-
Tin and Terne Plate—Hot dipped	9	34	172,384	3.4	-	1,518,567	3.3	228	1,924,657	3.9	-
—Electrolytic	9	35	131,777	2.6	-	1,146,456	2.4	529	909,173	1.9	-
Sheets—Hot rolled	30	36	602,947	11.8	51,431	* 5,348,965	11.5	* 429,531	5,521,463	11.3	421,198
—Cold rolled	17	37	439,181	8.6	2,383	4,014,039	8.6	19,864	4,075,554	8.4	3,397
—Galvanized	16	38	134,887	2.6	223	1,191,904	2.5	549	1,462,053	3.0	1,725
—Electrical and enameling	10	39	47,080	0.9	-	429,550	0.9	385	435,170	0.9	-
Strip—Hot rolled	23	40	141,647	2.7	28,961	* 1,295,268	2.8	* 219,716	1,363,812	2.8	237,176
—Cold rolled	34	41	136,282	2.7	2,060	1,201,097	2.6	20,854	1,282,146	2.6	25,904
Wheels (car, rolled steel)	5	42	28,837	0.6	-	270,535	0.6	2	252,308	0.5	348
Axles	5	43	14,816	0.3	-	135,930	0.3	53	130,461	0.3	221
All other	-	44	-	-	-	-	-	-	6,266	-	-
TOTAL STEEL PRODUCTS	141	45	5,118,839	100.0	422,023	*46,620,218	100.0	*4,038,833	48,775,532	100.0	4,297,889

* Adjusted. Report from American Iron & Steel Institute.

Unions Agree To Build Prefabs

Pledge avoidance of jurisdictional disputes in manufacture and erection of all-steel, porcelain-enameled housing by Lustron Corp. Crafts limited to three

A STEP toward elimination of jurisdictional labor disputes in the manufacture and erection of prefabricated housing was taken last week in the signing of an agreement between a leading manufacturer and three of the more important building trades unions.

Lustron Corp., Chicago, and the American Federation of Labor carpenters, electricians and plumbers unions announced a two-year contract which provides that only these three crafts will be engaged in the construction and erection of the prefabricated homes.

Reach Agreement — Under the agreement, members of the three unions will manufacture the homes in the factory. After the units are shipped to erection sites, members of the unions in that locality will erect them.

The agreement provides for "avoidance of jurisdictional disputes by limiting the number of crafts and the pledge of the international officers to advise locals of the terms and enforce these contracts if necessary."

Carl G. Strandlund, president of Lustron, which is preparing to start mass production of prefabricated homes at its Columbus, O., plant, said:

Eliminates Obstacles—"I firmly believe that we now have eliminated in advance all of the reasons for jurisdictional disputes and other obstacles to the efficient erection of houses that have plagued the building industry for years and delayed the postwar construction of homes."

Union spokesmen pointed out that the type of housing to be built by Lustron is all-steel, with porcelain enameled walls. No lathes, plaster or paint is involved. Other types of prefabricated housing might involve more craft unions.

October Steel Production Sets New Peacetime Record

October steel ingot and castings output totaled 7,564,302 net tons, a peacetime record, according to the American Iron & Steel Institute. The tonnage was exceeded only in 10 of the 45 war months. It was only 300,000 tons below the wartime peak of 7,826,257 net tons, set in March, 1944.

Steel production for the first 10 months of 1947, at 70,188,837 net tons, topped the full-year output for 1946 and exceeded production of any full year before 1941. October steel output was three-quarters of a million tons higher than the September production of 6,788,642 net tons.

Average operating rate during October was 97.6 per cent of capacity, highest rate since April, 1944.

Says FTC Does Not Insist On F. O. B. Mill Pricing

Federal Trade Commission is not seeking to enforce universal f.o.b. mill pricing, Robert E. Freer, FTC member, told the Denver Purchasing Agents Association last week. He said that a conspiracy must exist before any pricing system is illegal.

"Statements that the commission seeks to enforce universal f.o.b. mill pricing or to set up local monopolies are simply without foundation," stated Freer.

The pending complaint of the FTC against the steel industry charging price fixing and monopolistic practices and attacking the multiple basing point system of pricing, last week was amended to include two new charges. Added to the complaint was the charge that the steel companies in group meetings had reached an understanding to "forestall" increases in steel producing facilities, and second, the western mills had shipped steel to consumers in western territory on f.o.b eastern mill prices even though the steel was shipped from western mills.

Another amendment eliminates pig iron producers from the action. One hundred and one steel companies and the American Iron & Steel Institute are specifically named as respondents. As a result a number of companies not members of the Steel Institute now are charged in the FTC action.

Present, Past and Pending

■ WAA ASKS PLANT OWNERS TO EXERCISE OPTIONS

WASHINGTON—To expedite liquidation of remaining surplus property, the War Assets Administration is serving 30-day notices on private owners of plants containing government-owned production equipment. Action is intended to force a showdown with operators who have been postponing taking up their options.

■ CROSLEY TO EXPAND ENGINE PLANT FACILITIES

CINCINNATI—Crosley Motors Inc. is starting an expansion program to increase its Cincinnati engine plant facilities by 21 per cent and its final assembly plant at Marion, Ind., by 40 per cent.

■ MONOPOLY SUIT AGAINST U.S. STEEL DISMISSED

WILMINGTON—Federal Judge R. S. Rodney has dismissed a Justice Department suit to prevent the United States Steel Corp. and its subsidiary, Columbia Steel Co., from purchasing the steel fabricating assets and business of Consolidated Steel Corp., Los Angeles.

■ FORD TO SPEND HALF BILLION IN NEXT FIVE YEARS

CHICAGO—Ford Motor Co. has "open appropriations" totaling $250 million for improvement and expansion and "probably will spend twice that" during the next five years, said E. R. Breech, executive vice president, addressing a group of life insurance officials.

■ ROLLING MILL DESIGNED FOR CLADMETALS

CARNEGIE, PA.—A new rolling mill designed especially for the production of cladmetals is being readied by the American Cladmetals Co. in a 125 x 800 ft plant. Joseph Kinney Jr. is president of the company.

■ LOCAL LABOR UNIONS RUSH TO REGISTER

WASHINGTON—Local labor unions throughout the country are disregarding original defiance of the Taft-Hartley Act by top union leadership and are flooding the Department of Labor with registrations. At least 15,000 of the approximately 75,000 locals had filed last week and the others were expected to fall in line.

ERP Needs for Scrap, Steel Questioned

Harriman committee turns thumbs down on scrap exports. Urges requests for steel and equipment be screened carefully. Rejects as "nonsense" need for exports to insure domestic prosperity. Warns aid program will be inflationary

GRAVE doubts as to the ability of the United States to meet fully the requests of western European nations for iron and steel, scrap, fuel and some types of machinery and equipment are raised in the Harriman committee report on foreign aid. It questions whether the needs are as great as estimated at the Paris conference.

Specifically the committee turns thumbs down on exports of scrap and pig iron, advocates that requests for semifinished steel be trimmed down and that estimated requirements for sheet, strip and tin plate be carefully screened. Machinery and equipment requirements generally are given a high priority, although the committee cautions that the actuality of these needs be studied carefully.

The committee endorses a foreign aid program to cost between $12 and $17 billion. First year cost is estimated by the committee at $5.75 billion.

Imposes Heavy Burden—However, it warned that such a program will impose "a substantial burden upon the American people" and will entail considerable sacrifice.

The committee rejects as "nonsense the idea which prevails to a considerable degree in this country and abroad that we need to export our goods and services as free gifts to insure our own prosperity."

On the contrary, the committee is "convinced that the immediate economic danger to the United States is inflation, which means, among other things, a shortage of goods in relation to demand."

Asks Independent Administration—The Harriman committee recommends that the foreign aid program be administered by a new independent agency to be set up in the federal government and perhaps modeled along corporate lines. This agency would be headed by a chairman of the board, appointed by the President and confirmed by the Senate.

Basis for Congressional Action—The Harriman committee is made up of 19 representatives of industry, labor, banking and education, with the secretary of commerce serving as chairman. The committee's report is the third of three related studies which will supply much of the basic information on which the aid program will be formulated by Congress. The earlier reports include an inventory of national resources, made by a group headed by Secretary of Interior J. A. Krug (STEEL, Oct. 27, p. 52), and an analysis of the domestic economic implications of foreign aid, made by the President's Council of Economic Advisers (STEEL, Nov. 10, p. 73). The Harriman study integrates the other two into a comprehensive appraisal of the need for and effect of the aid program.

Warns of Inflation—The Harriman committee disagrees with some of the ideas advanced by President Truman and other administration spokesmen and with some findings of the Council of Economic Advisers. Particularly, the Harriman committee takes exception to the frequently expressed view that exports for foreign aid are not substantial inflationary factors.

Noting that exports contemplated under the aid program are a small proportion of this country's total output, the Harriman committee contends this gives little light on the real effects here.

"The real effects of the program arise out of special situations. If the American economy is pinched at certain spots or sectors, this may lead to serious repercussions throughout the entire economic structure.

"Even though the total sum of money spent for purchase in the United States of scarce commodities is small relative to the national income, its expenditure can set off a chain of inflationary reactions.

"In the case of a basic material such as steel, the inflationary impact may be felt in the form of pervading scarcities throughout the industrial structure."

Would Ban Scrap Exports—Caution in authorizing exports of metallic materials urgently needed in the domestic economy is urged by the Harriman committee. Particular stress is laid on the iron and steel scrap shortage, now limiting United States output of ingots.

During the war years, the United States lost 123.8 million tons of potential scrap through exports (see accompanying table).

The Committee for European Economic Co-operation, representing the 16 nations to benefit by the European Recovery (Marshall) Plan, asked for scrap supplies rising from 1.7 million tons in 1948 to 2.5 million tons in 1951.

The committee recommends that no scrap be exported. It is not convinced that the lack of scrap shipments would cripple the European steel program and believes that European scrap supplies are larger than assumed in the CEEC report. It recommends that a survey be undertaken in Europe to determine how European scrap requirements can be met from other sources.

Semifinished Steel—CEEC has asked for large quantities of semi-

ESTIMATED LOSS OF POTENTIAL SCRAP—1941-45

Item	Net Tons
Exports of steel plant products	31,000,000
Exports of fabricated steel	800,000
Estimated steel in overseas shipments of ordnance projectiles, etc.	21,700,000
Estimated steel in overseas shipments of military vehicles	6,100,000
Estimated steel in aircraft shipped overseas and not returned	2 900,000
Estimated steel in war and merchant ships sunk	3,800,000
Estimated steel in merchant ships transferred to foreign registry	5,700,000
Estimated steel in exported machinery	2,600,000
Estimated steel in exported railroad cars and equipment	2,000,000
Estimated steel in exported automotive units and parts	4,500,000
Estimated steel in exported pressed, formed and stamped items	3,500,000
Estimated steel in exported containers	9,900,000
Estimated steel in exported agricultural equipment and parts	1,200,000
Estimated steel in exported miscellaneous and unclassified items	4,500,000
Estimated steel shipped to converting and processing industries, later exported	11,400,000
Estimated steel shipped to wholesalers and distributors, later exported	12,200,000
Total	123,800,000

finished steel, principally for United Kingdom and Italy. These requirements originally were estimated at from 2,244,000 net tons in 1948 up to 2,475,000 tons in 1950.

The Harriman committee believes such large exports of semifinished would have adverse effects on the United States economy, by contributing to the general shortage of steel products, by dislocating supplies of nonintegrated steel mills, and by depleting the scrap supply. Under the circumstances, the committee recommends that only part of the stated requirements be supplied.

Finished Steel—CEEC requests for steel sheets and strip are four times our recent rate of exports to these countries. In view of the extreme shortage of flat-rolled steel, it is recommended that these requirements be screened carefully.

Tin plate requirements are more than double the recent rate of exports and here again the committee suggests the requests be subjected to careful scrutiny.

The 1948 requirements for other finished steel items are less than the recent rate of shipments and the committee believes CEEC may have understated these requirements.

Steel Capacity Expansion — Commenting on the agitation for greater steel industry expansion, the committee takes no position on the matter. It points out, however, that any expansion not now planned would contribute very little to the steel supplies in the years when European requirements will be greatest and that such expansion itself would absorb much steel while in progress.

Steelmaking Equipment—CEEC plans for expanding the European steel capacity call for import from this country of $400 million worth of iron and steel plant equipment over the next four years. The committee passes no final judgment as to the urgency of the need or the availability of the equipment, but places a high priority on the requirement.

Metallurgical Coke — Exports of coal to Europe involve a serious transportation problem and will contribute to the maintenance of a sellers' market in the coal industry. However, the committee believes the future export market will not materially change present conditions.

Machinery, Equipment — Europe's needs for farm, coal mining, power generating and other machinery and equipment are large. Domestic supply of most of these items are short of demand and supplying of European requirements must be subjected to careful study lest exports work too great a hardship on the domestic economy.

Fabricators' Costs Still Spiral

Stabilization and full production in structural fabricating industry prevented by featherbedding, delegates to AISC convention told. Banker says business slump not certain

SOLUTION of spiraling costs in the building industry is not in sight, T. R. Mullen, president, American Institute of Steel Construction, warned 450 structural steel fabricators meeting at the Roney Plaza Hotel, Miami Beach, Fla., for the 25th annual convention of the organization last week.

So long as productivity is subnormal, prices will be high, he said, pointing out that productivity in the building trades is down nearly 50 per cent from four years ago. It is gradually rising, but bricklayers are not yet laying 800 to 1000 bricks a day and ironworkers are still not giving 400 to 500 rivets on normal driving. Shop workmen are stalling.

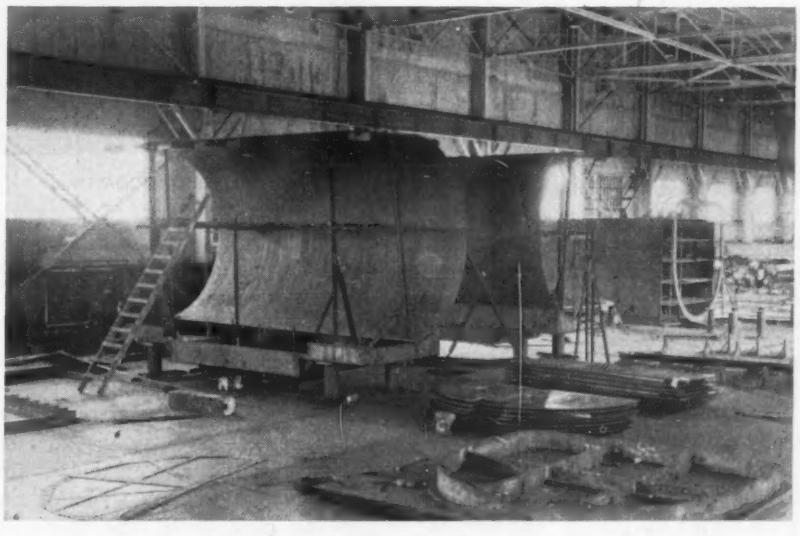
Must Stop Featherbedding—Featherbedding, said Mr. Mullen, in the structural steel industry must be stopped if stabilization and full production is to be attained. Requiring two men where only one is needed puts a burden on the cost of every operation. Reluctance of building trades unions to increase their memberships has caused a severe scarcity of workmen which results in overtime work with terrific cost on a construction project.

Mr. Mullen said that it had been hoped labor costs would be stabilized this year. However, the upward spiral is continuing. Many building trades in New York City, for example, received $2.50 an hour last January. Three or four months later, the bricklayers demanded and got $2.75 an hour. Now the plasterers are getting $3 an hour for a 6-hour day, and the iron workers are demanding an increase or a guaranteed wage.

Slump Not Certain — Murray Shields, vice president, Bank of Manhattan Co., New York, speaking on "Some Guideposts for Business Planning in 1948," said a business slump is not certain, but the risk of a painful decline in time is sufficiently great so that business and individuals will be well advised to allow for it in financial policies and planning.

"If a business slump occurs in 1948 it will be much less severe and will be shorter than the great deflation of the early 1930s," he said.

Herman H. Lind, president, American Institute of Bolt, Nut & Rivet Manufacturers, Cleveland, spoke to the delegates on "Fasteners for the Fabricating Industry." This address was followed by an engineering symposium participated in by Douglas Whitlock, chairman, Building Products Institute, Washington, D. C.; Katherine C. Parsons, Employers Advisory Council, Philadelphia; and E. T. Blix, manager, Mississippi Valley Structural Steel Co., Melrose Park, Ill.



GIANT CONDENSERS: Three 70,000-sq ft, twin-type steam condensers, among the largest of their kind, are in process of construction at the Pascagoula, Miss., yard of the Ingalls Shipbuilding Corp. They will be shipped to Los Angeles for use in a water and power plant

Talking It Over with Employees

Management bringing economic facts of life and intimate company problems to workers on increasing scale, speakers tell delegates to National Metal Trades convention

INDUSTRIAL management is talking things over with employees—giving them the facts of business—more than ever before. This was revealed at the 48th annual convention of the National Metal Trades Association at the Palmer House, Chicago, Nov. 5-7.

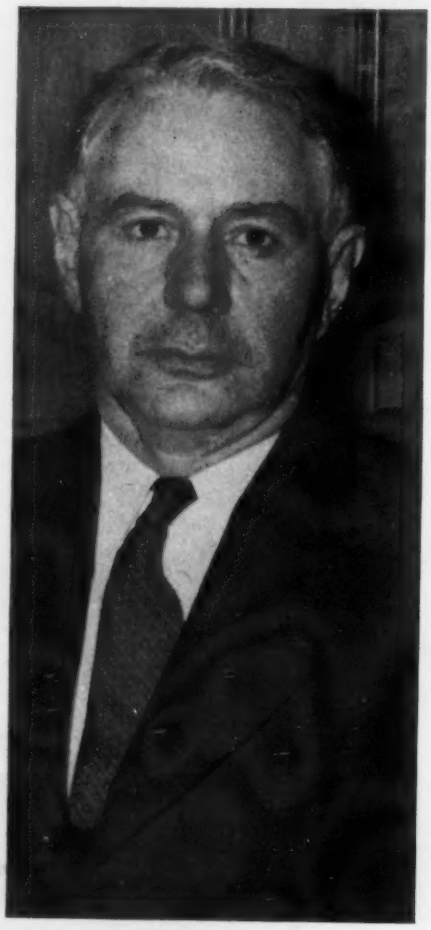
Theme of the convention was "Sound Industrial Relations for the Job Ahead." In discussions of current industrial relations problems, it was evident passage of the Taft-Hartley Act has paved the way for more extensive communications between employers and employees. Two ways of accomplishing this are gaining ground—talks by company heads to large groups of workers, and letters mailed directly to employees' homes.

Testimonial Dinner—One feature of the convention was a testimonial dinner for 283 companies that have been members of the association for a quarter of a century or more. Heading the list were four companies which have been members since 1899, when the association was formed. These are Barber-Stockwell Co., Cambridge, Mass.; Cincinnati Bickford Tool Co., Cincinnati; Benjamin Eastwood Co., Paterson, N. J.; and Jeffrey Mfg. Co., Columbus, O.

Postwar problems which have brought economic disorganizations and scarcity were appraised as an exciting challenge and opportunity by Frederick V. Geier, president, Cincinnati Milling Machine Co., Cincinati, speaking on "America Unfinished." He declared the resourcefulness and determination of industrial management can overcome them through more and more production.

Unit Costs Up—"In the face of sharp wage rate increases in basic industries, the attainment of low unit costs presents severe difficulties," the speaker asserted. "As a nation, our wage costs per unit of manufacturing production are already more than 65 per cent above their 1939 levels. Nor can these difficulties be overcome except by practical-minded men who can bring to bear all the latest and best in engineering, in equipment and in proven operating experience. Workers will have to come to understand that the only way to lower prices is through increased production per man-hour without corresponding increases in hourly pay."

For the past several years, industry has known that employees needed more information regarding costs, profits, dividends, and the like, observed Eric O. Johnson, general manager, American Central Division, Avco Mfg. Corp., Connersville, Ind. Like many other organizations, the speaker's company had labor-management committees, and finding these not enough had decided it would do a more thorough job of giving employees facts of its operations.



HOWARD GOODMAN
Re-elected president of NMTA

By end of 1946 the company's 2500 employees were asking so many questions that the management found it imperative to start holding meetings to give them the facts. Mr. Johnson reported much evidence of increased efficiency and morale after the first meeting when he said it was possible to tie the dollar sign to scrap loss. Shortly after the first meeting, scrap loss was reduced 25 per cent. Second series of meetings was held in August and a third is planned for December.

Don't Wait—Dr. Willard C. Faught, executive vice president, Young & Faught Inc., New York, management consultant, advised the convention delegates not wait for somebody to come along with a neatly packaged brand of industrial or public relations. Business management, he said, is the chief component of free enterprise, its administrator.

"If you don't assume the responsibility for explaining, demonstrating and selling the system, as well as its products, who will?" he asked.

"And when you do, don't take anything for granted," Dr. Faught continued. "Give your workers, your stockholders, your customers, your public all the facts. They will come to the right conclusions."

Addressing the convention on "Meeting the Labor Press on Its Own Ground," Robert Newcomb, partner, Newcomb & Sammons, Chicago, advocated better use of employee publications and house organs, informational manuals for new employees, more effective utilization of plant bulletin boards, annual reports for employees apart from the one to stockholders, and judicious use of moving pictures and slide films.

Not Partisan—Discussing the Taft-Hartley Act, Robert N. Denham, general counsel, National Labor Relations Board, emphasized that the act is not partisan legislation but rather corrective legislation that equalizes—or tends to equalize the balance—between organized labor, management, and the ordinary employee.

"Bargaining is still bargaining," he declared, "and as we read the act, it requires negotiation and an honest effort to reach an agreement. It also requires that when an agreement has been reached on all or a major portion of the subject under discussion, that agreement must be reduced to writing and signed by the parties as a permanent testimonial of what has been agreed upon, if either of the parties requests it."

The consequences of wartime development of labor costs in the form of fringe payments remain with industry in the postwar period, and many of the items impose burdensome labor costs, warned Lee A. Freeman, Rooks & Freeman, Chicago, attorneys. Other items directly or indirectly prevent management from utilizing its labor force flexibly and efficiently. But of even greater concern now, he continued, is the ever

present union pressure to extend farther the existence of these premiums, penalties and featherbedding devices. Having established the precedent under the extraordinary circumstances of a war economy, labor now assumes that fringe conditions have become usual practice.

Stabilizing Employment — Mercer Lee, vice president, International Harvester Co., Chicago, described the plan which his company is using to stabilize work employment through better planning of supply and inventory. In 1944, the company determined its normal annual sales requirements on a unit basis for all end products. Planning for specific annual requirements begins at least 15 months prior to the beginning of the year. Company maintains at all times specific annual requirements for two years—the current and the succeeding year. In projecting these requirements on the factories in this manner, a blending of production is possible.

This method of long-range production forecasting, production control and inventory management, properly planned and executed, Mr. Lee explained, is beneficial to each of the three groups to which the company has definite responsibility, namely, the customer, the stockholder and the employee.

Howard Goodman, vice president, Goodman Mfg. Co., Chicago, was re-elected president of the association to serve a second term. Also re-elected were First Vice President T. J. Morton Jr., president, Hoosier Cardinal Corp., Evansville, Ind.; and Second Vice President and Treasurer Joseph L. Kopf, president, Jabez Burns & Sons Inc., New York.

Thirteen councilors were elected for two years, four of these being new and nine being returned to office. The new are Joseph W. Crook, Grinnell Corp., Craston, R. I.; Robert Hess, Washburn Co., Worcester, Mass.; Russell C. Ball, Philadelphia Gear Works Inc., Philadelphia; and William L. Dolle, Lodge & Shipley Co., Cincinnati.

Councilors re-elected were: Howard A. Lincoln, Bemis & Call Co., Springfield, Mass.; H. Paul Nelligan, Easy Washing Machine Corp., Syracuse, N. Y.; R. A. Mitchell, Pittsburgh Forgings Co., Coraopolis, Pa.; Adrian Collins, Jarecki Mfg. Co., Erie, Pa.; J. I. Schultz, National Broach & Machine Co., Detroit; E. L. Usner, Ross Gear & Tool Co., Lafayette, Ind.; C. R. Rosborough, Moline Tool Co., Moline, Ill.; and M. E. Erskine, Racine Tool & Machine Co., Racine, Wis.

Foundries Must Be Mechanized

National Founders Association members told that better housekeeping, modern equipment and motion studies will increase output and improve labor relations. New labor bills pending

BETTER housekeeping, mechanization, health and safety and improved labor relations in the foundry industry were covered by a broad and well balanced program at the annual meeting of the National Founders Association, New York, Nov. 6-7.

Need Better Mechanization — Discussing mechanization as an aid to improved labor relations, Bruce L. Simpson, president, National Engineering Co., Chicago, analyzed a survey among the senior class of a midwest technical college which indicated a reluctance on the part of men technically trained in selecting the foundry industry for their life work. Yet, from such groups largely come the future supervisory forces. Better mechanization tends to attract supervisory personnel. The machine is labor serving and not labor saving, declared Mr. Simpson in denying the machine has reduced employment. Proof for this premise is found in the automobile industry with its huge employment.

Conveyors First Step —In mechanization of the foundry, the overall program should be initiated with a thorough clean-up and paint-up. Get the most possible out of present equipment and mechanize gradually, department by department, meanwhile maintaining productivity, Mr. Simpson advised. Roller conveyors are often the first step toward an increase of up to 20 per cent in molds. He advocated mechanical shakeouts and central sand storage and distributing systems. The fact was brought out with Mr. Simpson's introduction that National Engineering Co. is currently supervising the installation of equipment for one of the most mechanically modern foundries, International Harvester Co., Louisville, Ky.

Avoid Propaganda — Management should take full advantage of the free speech provision in the new labor-management relations act, but should avoid propaganda, threats and promises of rewards, according to George Moredock, labor relations division, International Harvester Co. An employee information program should explain what the company is doing and why; foremen and other supervisory personnel should be fully cognizant of the policy and aims involved before information is formally released. International Harvester deals with scores of labor unions.

Top management executives should give more time and co-operation to the junior executives, supervisory personnel and foremen, in the opinion of H. J. Post, general manager, National Association of Foremen, Dayton, O. Foremen are often ignorant of pending labor negotiations and first

NATIONAL FOUNDERS ASSOCIATION COMMITTEES

FIRST—Henry C. Griggs, The Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., chairman; H. A. Davis, Fremont Casting Co., Worcester, Mass., vice chairman; Charles Wesson, Sargent & Co., New Haven, Conn.; Frank Chaffee, Patch-Wagner Co., Rutland, Vt.; and B. J. Barrell, The Grinnell Co., Cranston, R. I.

SECOND — G. W. Hannay, Barnett Foundry & Machine Co., Irvington, N. J., chairman; W. E. Thomas, Straight Line Foundry & Machine Corp., Syracuse, N. Y.; A. W. Thompson, Ludlow Valve Mfg. Co., Inc., Troy, N. Y.; F. A. Juckett, Sandy Hill Iron & Brass Works, Hudson Falls, N. Y.; and E. Gray Merrill, De Laval Separator Co., Poughkeepsie, N. Y.

THIRD—G. R. Casey, Treadwell Engineering Co., Easton, Pa., chairman; C. S. Roberts, Dodge Steel Co., Tacony, Philadelphia, Pa., vice chairman; F. E. Walling, Lewis Foundry & Machine Division, Blaw-Knox Co., Pittsburgh; J. R. Berg, Mesta Machine Co., Pittsburgh; and H. W. Johnson, DeLaval Steam Turbine Co., Trenton, N. J.

FOURTH — Ralph J. Teetor, Cadillac Malleable Iron Co., Cadillac, Mich., chairman; H. C. Hoenicke, Eaton Mfg. Co., Detroit, vice chairman; Clinton St. Clair, Lukenheimer Co., Cincinnati; Earl M. Reynolds, Detroit Brass and Malleable Works, Detroit; and John M. Price, Ferro Machine & Foundry Co., Detroit.

FIFTH—C. B. Magrath, Greenlee Foundry Co., Chicago, chairman; A. V. Martens, Pekin Foundry & Mfg. Co., Pekin, Ill.; William H. Muchnic, Locomotive Finished Material Co., Atchison, Kans.; H. L. Hoefman, Link-Belt Co., Chicago; and Gust Olson Jr., John Deere Tractor Co., Waterloo, Ia.

SIXTH — J. D. McDonald, Vulcan Iron Works Ltd., Winnipeg, chairman; James M. White, Allis-Chalmers Mfg. Co., Milwaukee, vice chairman; C. E. Staky, D. J. Murray Mfg. Co., Wausau, Wis.; A. L. McKay, Kaukauna Machine Corp., Kaukauna, Wis.; and R. L. Claussen, J. I. Case Co., Racine, Wis.

SEVENTH—John D. Capron, Glamorgan Pipe & Foundry Co., Lynchburg, Va., chairman; A. J. Fruchtl, United States Pipe & Foundry Co., Chattanooga, Tenn., vice chairman; E. P. Trout, Lufkin Foundry & Machine Co., Lufkin, Tex.; J. S. Bridges, United States Pipe & Foundry Co., Bessemer, Ala.; and Warren Whitney, James B. Clow & Sons Division, National Cast Iron Pipe Co., Birmingham, Ala.

details are frequently obtained from the shop stewards; this is a mistaken policy, said Mr. Post, who asks that more confidence be placed with foremen.

Two New Labor Bills — In outlining purposes of the Taft-Hartley Act, Congressman Hartley reiterated his intention of introducing two new bills in January to further correct labor abuses. One will be a "right to work" bill, making it a federal offense to interfere with workers or their families when they are going to their jobs. Another will provide for invoking antitrust laws against labor unions which restrain trades through labor monopolies and other monopolistic practices.

Make Jobs Attractive — Foundrymen were urged to devote more attention to motion studies as one important measure toward increasing production, placing it on a more economical basis, and reducing worker fatigue and in general making the job more attractive to the employee. James H. Smith, general manager, Central Foundry Division, General Motors Corp., Saginaw, Mich., said this must be done if foundries are to compete successfully when the industry is again in a buyers' market, instead of a sellers' market, as at present. As foundries are now making a reasonably good profit, he thought there should be no delay in getting a sound program under way, pointing out that much could be done with only relatively minor expenditures for necessary changes in equipment and method.

With the aid of Stewart Martin, in charge of motion picture study work of the General Motors plant in Danville, Ill., he demonstrated by actual operation at the meeting substantial savings in core making, with a pick-up of 90 per cent in production in one instance.

Henry Hazlitt, business analyst, *Newsweek*, discussed what America is going to do and what America ought to do as far as the European situation is concerned. He pointed out that if we extend aid to Europe without attaching certain restrictions, the funds likely will be dissipated without benefit. On the other hand if we attach conditions, our action will be resented in Europe and the Reds will be able to talk.

New Officers — I. R. Wagner, Electric Steel Castings Co., Indianapolis, was re-elected president; Franklin Farrel III, Farrel-Birmingham Co. Inc., Ansonia, Conn., vice president; and Leroy E. Roak, Chicago, executive vice president and secretary-treasurer.

JANMAT Activity Slows Scrapping

WAA prevented from selling machine tools for scrap until services decide on standby requirements. Many types of industrial equipment seen needed

UNTIL the armed forces decide how many of the government's surplus machine tools they are going to put into standby reserves under Public Law 364, 80th Congress, War Assets Administration will have to defer decisions on whether it will sell certain classifications of tools as scrap. Several months may be required by the services.

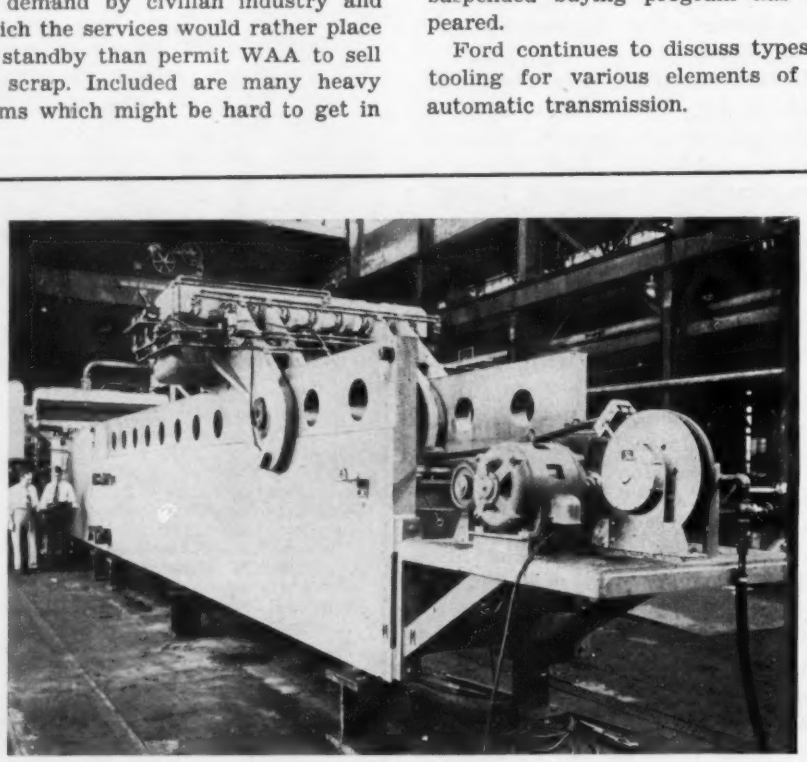
Joint Army-Navy Machine Tool Control Committee has split its task into three phases. Phase 1 covers acquisition of the 92,000 standard, general-purpose machine tools in the original standby program; work on this phase is due for completion by next Feb. 4, the end of the six-month period stipulated for this phase. Phase 2 covers additional standard machine tools over and above the original 92,000.

Other Items Needed—Phase 3 includes a host of tools and items of production equipment which are not in demand by civilian industry and which the services would rather place in standby than permit WAA to sell as scrap. Included are many heavy items which might be hard to get in time of emergency—big hydraulic presses, large air compressors, etc. Small tools such as bench lathes, punch presses, etc., handy for servicing production lines, and miscellaneous items such as welding equipment, cranes, lift trucks, conveyors, etc. are also in this category.

Equipment Buying Program Suspended by GM Division

Mystery surrounds cancellation of an extensive equipment buying program for the Detroit Transmission Division, General Motors, builder of the Hydra-Matic transmission used by Cadillac and Olds and scheduled for availability on 50 per cent of Pontiac's 1948 models. It does not appear output of these units could be stepped up to this degree without large expansion of manufacturing facilities. No reinstatement of the suspended buying program has appeared.

Ford continues to discuss types of tooling for various elements of an automatic transmission.



825-TON CAPACITY: Of the self contained oil hydraulic type, this stretcher-leveler of special design, has a capacity of 825 tons and will accommodate plates or sheets up to 100 in. wide. Maximum and minimum plate length is 33 and 7 ft, respectively. Believed by its manufacturer, Hydropress Inc., New York, to be the largest ever made, the machine has two gripheads, one of which is actuated by the hydraulic stretching cylinder. Position of the other cylinder is adjustable to compensate for varying plate length

Metalworking Earnings Shrink

50 manufacturing companies see aggregate net income in third quarter slip 5 per cent under second quarter as result of increased operating costs and interruptions to production

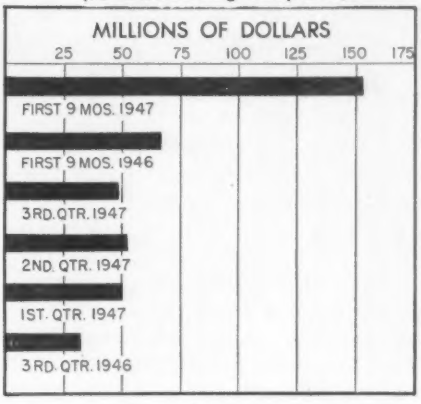
REFLECTING increased operating costs and interruptions to production, third quarter net earnings of the metalworking industry declined slightly from those of the second quarter.

The accompanying compilation by STEEL shows that 50 companies representing a broad cross-section of the metalworking industry had 5 per cent smaller aggregate net earnings in the third quarter than in the preceding three months. This decline is attributed to summer vacations, holidays, lowered production during hot weather, and shortage of materials, notably steel. Third quarter total earnings were slightly under those of the first quarter also. Of the 50 companies, 29 showed lower net earnings in the third quarter than in the second.

Despite the downtrend of earnings, the aggregate for the third quarter of 1947 still was 39 per cent over that for the corresponding period of last year when industry was striving to complete reconversion and recover from effects of strikes earlier in the year. Good earnings performance in the first two quarters of 1947 plus that of the third quarter enabled the 50 companies to show for the first nine months of this year aggregate earnings that were more than double those for the first nine months of 1946. Forty-four of the companies have greater net profits thus far in 1947 than in the corresponding 1946 period.

Net Earnings at a Glance

(50 Metalworking Companies)



	Third Qtr. 1947	Second Qtr. 1947	First Qtr. 1947	Third Qtr. 1946	First 9 Mos. 1947	First 9 Mos. 1946
Air-Way Electric Appliance Corp.	$217,475	$256,197	$194,680	$113,029	$668,352	$169,114
American Brake Shoe Co.	957,604	1,057,151	1,510,444	1,103,295	3,525,199	2,449,422
American Machine & Metals, Inc.	111,621	80,721	191,856	69,828	384,198	245,897
American Radiator & Standard Sanitary Corp.	3,692,000	3,678,788	3,478,212	1,463,819	10,849,000	3,221,471
American Stove Co.	226,694	500,256	385,334	382,091	1,112,284	675,719
Autocar Co.	9,056	517,767	1,326,253	438,047	1,853,076	1,262,923
Blaw-Knox Corp.	842,238	608,761	773,522	688,741	2,224,521	1,742,805
E. W. Bliss Co.	622,423	869,660	742,209	656,023	2,234,292	1,116,110
Budd Co.	1,318,161	1,527,772	1,812,568	*569,231	4,658,501	*2,780,656
Chapman Valve Mfg. Co.	217,951	150,317	99,372	56,599	467,640	286,422
Clark Equipment Co.	925,906	973,962	669,760	1,075,386	2,569,628	47,889
Cleveland Graphite Bronze Co.	363,193	1,024,293	1,055,823	883,790	2,443,309	1,503,885
Detroit-Michigan Stove Co.	467,772	613,652	618,719	581,453	1,700,143	1,234,391
Diamond T Motor Car Co.	518,073	375,169	466,280	264,241	1,359,522	225,986
Doehler-Jarvis Corp.	1,650,795	2,095,408	2,156,906	1,512,375	5,903,109	3,126,485
Eaton Mfg. Co.	2,058,932	1,696,164	1,793,096	865,887	5,548,192	1,793,730
Electrolux Corp.	891,705	1,074,141	1,021,507	847,514	2,937,353	2,184,329
Evans Products Co.	197,870	169,403	629,956	343,140	997,229	411,022
Gabriel Co.	87,766	70,854	115,968	56,282	274,588	237,036
General Cable Corp.	1,361,490	1,637,612	1,628,298	2,342,658	4,627,400	1,333,719
Greenfield Tap & Die Corp.	104,418	209,079	244,926	290,625	558,423	736,050
Holland Furnace Co.	1,446,738	825,250	*118,598	869,197	2,153,390	1,200,206
Houdaille-Hershey Corp.	947,214	910,514	836,065	606,193	2,693,793	817,742
International Business Machines Corp.	6,282,741	6,024,913	5,303,148	4,927,216	17,610,802	13,115,986
Kalamazoo Stove & Furnace Co.	161,106	22,743	41,267	*167,439	225,116	*290,634
Lane-Wells Co.	517,100	384,800	340,500	253,000	1,242,400	604,100
Link-Belt Co.	1,467,489	1,852,495	1,489,460	1,164,253	4,809,444	2,193,907
Marion Power Shovel Co.	167,528	238,458	211,638	30,854	617,624	79,869
Maytag Co.	1,599,369	1,718,754	1,141,353	935,933	4,459,476	2,067,609
Minneapolis-Honeywell Regulator Co.	1,300,525	1,493,829	1,808,514	1,281,529	4,602,868	2,912,195
Monarch Machine Tool Co.	149,170	160,357	194,320	171,177	503,847	454,928
Mullins Mfg. Corp.	1,416,410	1,364,996	959,585	319,996	3,740,991	340,840
National Acme Co.	476,442	616,270	605,435	701,619	1,698,147	1,860,951
National Cash Register Co.	2,534,887	2,637,131	2,373,670	1,057,332	7,545,688	1,315,739
National Supply Co.	2,638,278	2,151,633	1,771,025	887,262	6,560,936	2,129,572
New York Air Brake Co.	410,756	439,378	330,258	225,953	1,180,392	733,181
Noblitt-Sparks Industries Inc.	709,303	618,532	372,491	218,364	1,700,326	253,747
Reo Motors Inc.	784,527	1,379,010	1,336,475	608,145	3,500,012	1,160,492
Simonds Saw & Steel Co.	398,808	751,789	858,892	1,011,931	2,009,489	2,240,055
Square D Co.	906,556	1,077,241	784,545	742,347	2,768,342	1,518,228
Studebaker Corp.	1,564,065	1,932,218	1,655,760	49,030	5,152,043	*251,770
Symington-Gould Corp.	7,164*	18,614	20,859	204,068	32,309	66,327
Twin Coach Co.	745,992	486,000	332,700	*315,669	1,564,692	*1,048,469
United-Carr Fastener Corp.	382,281	249,907	368,511	406,892	1,000,699	414,155
U. S. Hoffman Machinery Corp.	137,669	324,173	308,516	553,200	770,358	1,391,228
Victor Equipment Co.	75,116	94,103	101,925	150,925	271,144	260,106
Westinghouse Air Brake Co.	3,201,962	3,195,892	3,382,263	2,456,005	9,780,117	6,748,715
Weston Elec. Instrument Corp.	144,438	96,969	309,683	392,260	551,090	1,011,080
Worthington Pump & Machinery Corp.	1,564,872	1,474,897	1,702,657	2,032,936	4,742,426	2,289,616
Yale & Towne Mfg. Co.	339,606	667,525	556,355	194,154	1,563,486	*524,450
Totals	$49,306,927	$52,395,518	$50,294,961	$35,434,255	$151,997,406	$66,309,000

*Net loss.

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

Discussion of proposal to operate all business by labor-management committees scheduled for meeting of International Labor Conference in San Francisco next year. American delegates seen opposing legislative action

EFFORT to obtain general adoption of the idea of running industry under labor-management committees will be made in 1948. This time the goal will be sought through the force of law.

The proposal will be under discussion at the International Labor Conference of the International Labor Organization to be held in San Francisco next June. The plan is to draft a report urging that the 54 participating nations adopt the principle by legislative or other effective means. The United States will get two official copies, one to go to the Congress and one to the Labor Department.

Stems From ILO Meetings—This proposal comes from the recent meetings of the ILO Iron & Steel and Metal Trades Committees at Stockholm. It goes much further than the wartime use of labor-management shop committees to stimulate production. In fact, it is largely along the lines of the industry council idea so forcefully proclaimed by Philip Murray of the CIO in 1945. There would be a national labor-management committee over each key industry, there would be company labor-management committees, and there would be plant committees. The resolution states the objective is to insure "the most effective use of resources." At the insistence of management delegates to Stockholm, it was modified to the extent of assuring that "no restrictions on the prerogatives of management" are intended.

Although the proposal is favored by a majority of delegates, the real controversy will be between foreign delegates who believe in sweeping state controls and our own people who believe in free enterprise. The American labor leaders are expected to work to prevent inclusion of amendments and riders regarded as radical under American concepts.

Definite Action Doubted—A Labor Department spokesman said he doubted whether any definite action on the labor-management committee resolution will be taken at San Francisco inasmuch as it is customary to vote on such proposals only after the second discussion and this will mark the first discussion on this subject by the ILO annual legislative conference. While there is strong sentiment in the ILO for giving the labor-management committee proposal the force of law, this spokesman doubted whether the ILO legislative conference in its second discussion of the proposal would pass such a proposal by the necessary two-thirds majority. United States delegates, he said, are against imposing labor-management committees by law and favor their adoption by voluntary collective bargaining. No matter what the ILO votes, however, says this spokesman, the Labor Department will not ask any legislation on this subject but will give its moral support to voluntary adoption of labor-management committees such as are now functioning in the steel industry.

David A. Morse, as assistant secretary of labor, will head the United States delegation to San Francisco. Senator Elbert D. Thomas (Dem., Utah) probably again will be the other delegate for the government. The industry delegate is expected again to be J. D. Zellerbach, Crown-Zellerbach Corp., San Francisco. With the death recently of Robert J. Watt, the post of labor delegate remains to be filled. Mr. Morse has the delicate assignment of deciding whether a CIO man shall be selected this time; Mr. Watt was the AFL's international delegate.

Discuss Other Subjects—Other subjects that come under the head of labor-management relations will be discussed and probably acted on at San Francisco, the most important being a proposal under which all participating countries would guarantee the rights of their workers to form labor unions. Also to be discussed is a resolution calling for a worldwide campaign for education in industrial safety.

Certain other resolutions approved at Stockholm, of equally high significance to American industry from a long-range point of view, were referred to the ILO executive council meeting to be held at Geneva in December. The main one, which was objected to by industry delegates at Stockholm on the ground that it would pave the way for an undue degree of state management over industry, calls for surveys to list the raw materials and other resources of each country. The ultimate goal is to have each country produce the goods for which it is in a favorable position. A rider to this resolution calls for outside aid for underdeveloped countries to encourage output.

Will Be Referred—These "regularization of employment" proposals, upon ratification by the ILO executive council, will be referred to the United States Labor Department, for the United States, with the expectation that the recommended course of action will be launched by our Labor Department in the earliest practicable future.

In trying to discuss the third important subject on the agenda, guaranteed wage systems, the Stockholm delegates threw up their hands. They decided that they needed a lot more information than they now have before they can formulate any sound guaranteed wage program. To remedy this deficiency, the ILO secretariat at Montreal will undertake an intensified study of the subject of security of income for workers.

PRODUCTIVITY CLIMBS

Productivity, or output per man-hour, was higher in 1946 than in 1945 in 18 of 23 manufacturing industries for which data are available. The gain is depicted in a preliminary table for the first postwar year compiled by the Bureau of Labor Statistics. Eventually the bureau will revise its productivity indexes from 1939 through 1945, but is now submitting its procedures for compiling these indexes to qualified persons for comments and suggestions.

During 1946 in the 23 industries, which for the most part were producers of consumers' nondurable goods, gains of from 5 to 10 per cent in output per man-hour were made in nine; increases in excess of 10 per cent occurred in four industries. Five of the industries experienced small or negligible gains, and the remaining five suffered decreases in productivity ranging up to 5 per cent.

Western Manganese Ores

Only 47 of nearly 300 samples of low-grade manganese ores from 12 western states examined by the Bureau of Mines over a period of about

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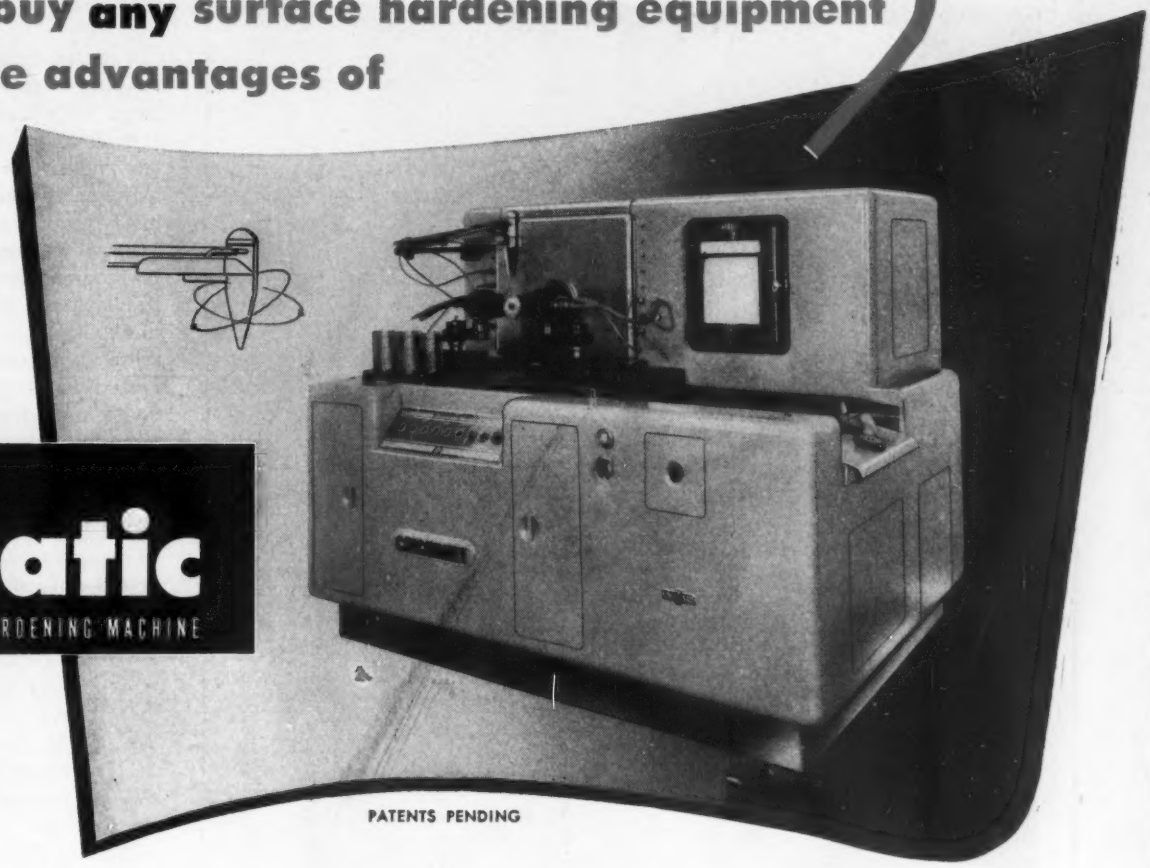

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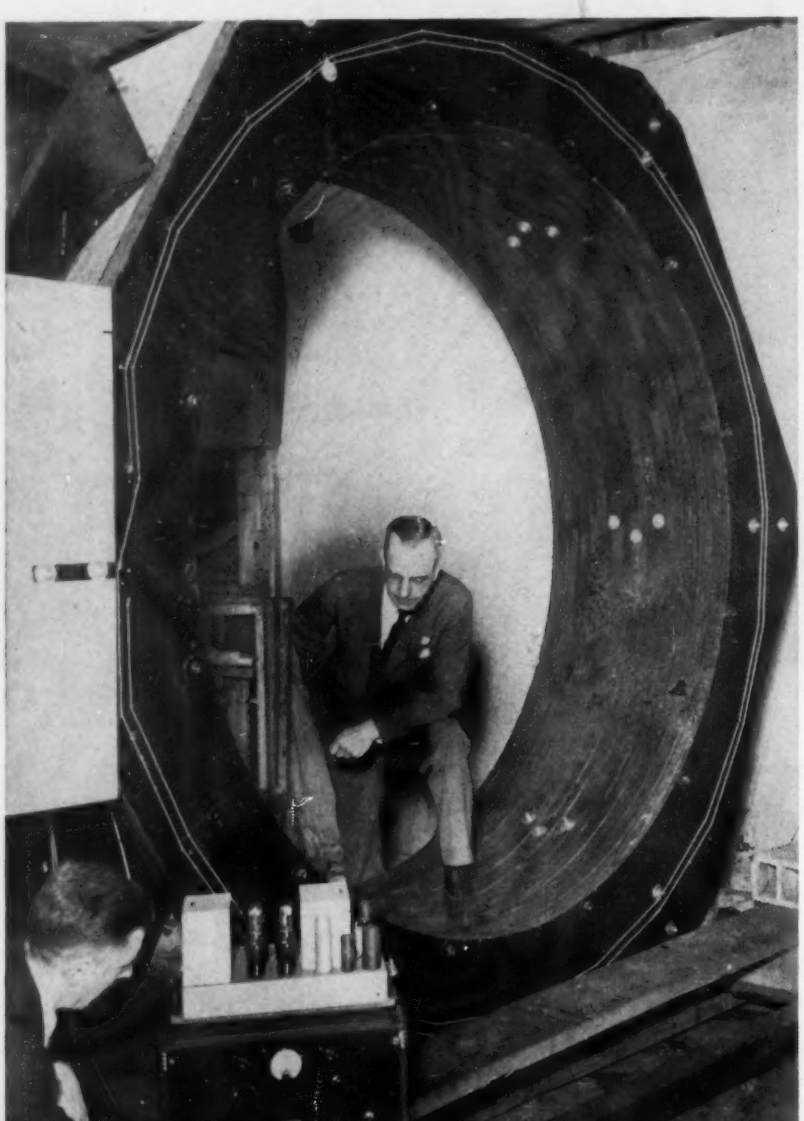


POINTS OUT METALS: Millions of feet of lumber, embedded with metal fragments and an undetermined number of unexploded artillery shells are to be salvaged by a special electronic metal detector developed by General Electric Co., Schenectady, N. Y. Being built for U. S. Corps of Engineers to permit continuation of timbering operations in the 3718-acre "Marne Forest" tract on the Ft. Lewis military reservation, Wash., the device is designed to operate continuously at a rate of 10 to 40 feet per minute in scanning nearly 20,000 feet of timber per day. Coil shown establishes a magnetic field across its 60-inch diameter through which the logs are to float. Any metallic object ⅝-inch diameter or larger in the logs creates a voltage unbalance due to changes in magnetic field, revealing its location

six years proved valueless because of their low grade or chemical or physical nature, according to James Boyd, director of the bureau.

One hundred and four of the 288 samples could be used in production of high-grade manganese, Director Boyd's report shows, and 137 samples could be treated to meet low-grade ore specifications either for direct emergency use or later metallurgical processing. The remaining 47 samples could not be concentrated by ore-dressing methods.

As a part of the bureau's long range mining and metallurgical research program to utilize reserves of low-grade manganese, samples were tested from 154 deposits in Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, South Dakota, Utah, Washington, and Wyoming.

Various types of manganese ores, ranging from 4 to 47 per cent manganese, were used in the experiments, and each ore was tested by at least two methods—gravity and flotation. Frequently, all known ore-dressing methods or combinations were tried.

Most western manganese ores are predominantly oxide ores, which can be treated if sufficiently complex methods are used. In most cases, high-grade oxide ores were readily concentrated in bureau tests, except when containing iron oxides or siliceous gangue. On the other hand, low-grade oxide ores lost 25 per cent of the manganese, and high or moderate recoveries were unusual.

Affidavits Filed with NLRB

The National Labor Relations Board recently announced that approximately 11,000 noncommunist affidavits were received during October. As of the close of business on Oct. 31, the board had on file 19,306 affidavits, compared with 8208 received by Sept. 30.

During October, 8536 AFL officers filed affidavits, of whom 8374 are officials of union locals and 162 international officers. By the end of October, the board had on file 13,320 affidavits from AFL officers. These affidavits covered 1635 union locals and 66 internationals.

During the month, 424 CIO officers filed affidavits, of whom 368 are officials of union locals and 56 are international officers.

During October, 2138 independent union officers filed affidavits, of whom 2049 are officials of union locals and 89 are international officers. By the end of the month, the board had on file 5378 affidavits from independent union officers, covering 683 union locals and 30 internationals.

Plans Pipeline Facilities

The Federal Power Commission has set a hearing to begin Nov. 19 on an application by Wisconsin Southern Gas Co. requesting: (1) Certificate of public convenience and necessity authorizing acquisition, construction and operation of pipeline facilities in Kenosha, Racine and Walworth counties, Wisconsin; and (2) an order by the FPC requiring Natural Gas Pipeline Co. of America to extend its facilities to establish connection with the facilities which Wisconsin Southern proposes to acquire and construct, and to sell natural gas for distribution in southeastern Wisconsin.

Postwar Wages Up 31 Per Cent

Second round of increases raises rates in manufacturing industry about 11 per cent since October, 1946. Weekly earnings are 21 per cent above V-J Day level

IS THE STAGE being set for another round of wage increases—the third since the end of the war?

Definite answer to that question is impossible at the moment but there are rumblings in labor circles which are heard with no little concern by employers.

With living costs still rising, the urge for more in pay envelopes is becoming increasingly insistent and it is generally agreed that unless the government's anti-inflation program is successful in stemming the price spiral a new general wage drive is almost certain to get under way over the next few months.

Above Year Ago—Second round of postwar wage increases had, on Sept. 15 this year, raised wage rates in manufacturing industry by about 11 per cent above the October, 1946, level, according to estimates by the Bureau of Labor Statistics.

This amount, applied to the 18 per cent average increase resulting from first-round wage adjustments, brought total postwar advances in manufacturing wage rates to an estimated 31 per cent.

Average weekly earnings in September were only 21 per cent above the V-J Day level, however, and average hourly earnings 22 per cent. These smaller advances in earnings compared with the average increase of 31 per cent in rates reflect such factors as reduction in the length of the work-week and the redistribution of employees among industries following reconversion to peacetime production.

Virtually all manufacturing industries and industrial areas have shared in the wage gains, although not uniformly. The value of the increase has been largely offset by rising prices. The consumers' price index for moderate income families in large cities had advanced by about 24 per cent above the V-J Day level in August, 1947, one month earlier than the date to which increases are measured.

Similar Increases Shown—Similar wage increases for comparable periods of time likewise occurred in the group of nonmanufacturing industries included in the Bureau's Urban Wage Rate series, i.e., wholesale and retail trade, finance, insurance and real estate, local utilities and the service industries. These industries registered a composite gain of about 24 per cent between April, 1945, and April, 1947. Retail trade had the greatest increase, 28 per cent; finance, insurance and real estate had advanced rates only 16 per cent.

For nonmanufacturing workers, Los Angeles was well ahead of other cities in the amount of postwar wage increase, with an average 39 per cent gain in rates during the 2-year period ending in April, 1947.

Providence and Pittsburgh also ranked high in this respect but, unlike Los Angeles, they had shown lower than average advances during the war period.

Cleveland had relatively small nonmanufacturing wage increases during both the war and postwar periods. Additional increases have occurred in these nonmanufacturing industries since April, but their magnitude cannot be measured from data now available.

COMPARATIVE SUMMARY OF CHANGES IN EARNINGS AND WAGE RATES IN MANUFACTURING, JANUARY, 1941—SEPTEMBER, 1947

Period	Per cent of change in specified period: Gross weekly earnings	Gross hourly earnings	Adjusted hourly earnings †	Urban wage rates	General wage changes
January, 1941—September, 1947	+89.3	+83.2	+82.7	‡ +74.4	§
January, 1941—October, 1942	+46.0	+30.7	+21.5	‡ +17.0	+12.6
October, 1942—August, 1945	+ 7.3	+14.7	* +15.6	‡ +13.9	+ 3.6
October, 1942—April, 1943	+ 9.2	+ 5.7	+ 3.2	‡ + 3.0	+ 1.1
April, 1943—October, 1943	+ 5.6	+ 4.7	+ 3.6	+ 3.8	+ .5
October, 1943—April, 1944	+ 1.5	+ 2.5	+ 3.0	+ 1.9	+ .5
April, 1944—October, 1944	+ 3.1	+ 1.8	+ 2.1	+ 2.2	+ .4
October, 1944—April, 1945 (VE-day)	+ .4	+ 1.3	+ 1.9	+ 1.6	+ .5
April, 1945—August, 1945 (VJ-day)	—11.5	— 1.9	* + .9	+ .7	+ .4
August, 1945—September, 1947	+20.9	+22.2	* +30.0	‡ +30.8	**
August, 1945—October, 1945	— 1.8	— 3.8	* + 1.0	+ 1.7	+ 1.5
October, 1945—February, 1946	— 1.0	+ 1.7	+ 4.2	+ 4.3	+ 4.3
February, 1946—April, 1946	+ 5.7	+ 5.6	+ 4.6	+ 5.3	+ 5.1
April, 1946—October, 1946	+ 6.5	+ 6.8	+ 6.6	+ 5.7	+ 4.9
October, 1946—April, 1947	+ 3.9	+ 5.0	+ 4.7	+ 5.2	+ 4.3
April, 1947—September, 1947	+ 6.1	+ 5.5	+ 5.8 ††	+ 5.3	‡‡

† Hourly earnings, excluding premium pay for overtime, and with industries weighted in proportion to their 1941 employment. ‡ Partially estimated. § Data not available. The increase from January, 1941, to April, 1947, was 41.8 per cent. * Data not available for August, 1945; July, 1945, data substituted. ** Data not available. The increase from August, 1945, to April, 1947, was 21.5 per cent. †† Estimated. ‡‡ Data not available.

Technical Personnel May Be Scarce Until 1949 or 1950

The latest manpower shortage, that of technically trained personnel, will last well into 1949 or 1950, according to H. N. Muller, manager of the educational department for Westinghouse Electric Corp.

This shortage, says Mr. Muller, stems directly from industrial expansion, coupled with the relatively few engineers and scientists graduated from colleges during the war. Westinghouse alone is now recruiting from the colleges 100 more men each year than during prewar times. Engineering colleges report a 100 per cent increase in the number of companies interviewing their graduates in comparison with prewar standards.

Armed Forces' Plans To Release Surpluses Changed

Decision by the armed services to keep about $5 billion worth of supplies they had previously intended to put on the war surplus market has been disclosed by Robert M. Littlejohn, War Assets administrator. Some of these supplies, chiefly clothing and other relief goods, which had been declared surplus have been withdrawn from public offerings to aid stricken areas domestically and abroad, he said.

The services' change of mind about releasing the supplies was the result of a changed policy relating to stocks on hand, say Army officials.

Retention of these supplies by the services will lighten WAA's disposal task, and General Littlejohn now reports his agency will have disposed of almost 90 per cent of its inventory by next June 30, leaving surpluses worth about $3.1 billion, of which about three-fourths will be real property requiring a program of "several years' duration" to get into private hands.

Rapid liquidation of the remaining inventory of consumer goods, industrial equipment, aircraft and electronic equipment will occur over the next six to nine months, the general said, but explained that "increasingly larger portions of available inventory consist of consumer and producer goods of poor quality, special purpose machinery and 'hard-to-sell' real properties."

How Much Aid for Aircraft?

National aviation policy, in process of formulation, may provide subsidies to aid in development of new planes and help lift industry from its postwar slump

AIRCRAFT manufacturers are looking toward formulation of a permanent national aviation policy to rescue them from their postwar doldrums.

Two groups are working on the project. One is the President's Air Policy Commission, headed by Thomas K. Finletter, New York attorney. The other is the joint Congressional Aviation Policy Committee of which Sen. Owen Brewster (Rep., Me.) is chairman.

The President's commission was established last July to "find and recommend a course of action that will bring the greatest possible benefits from aviation and bring increased aircraft production."

The commission has been holding hearings for the past two months and will report to the Chief Executive by Dec. 31.

The joint congressional committee has held only a few hearings to date and these have been concerned with the recommendations of the military. The committee will report to Congress by Mar. 1.

Interests Metalworking Companies—What form the national aviation policy takes, of course, is of interest to thousands of metalworking companies because the net effect will be to determine how much of a market the aviation industry is to be in the future. It has been pretty well determined in the hearings to date that if this country is to hold its own with, or lead, the rest of the world in the field of aviation, a much larger program will be needed than is within the compass of the financial resources of the industry. Perhaps the single most difficult question to be decided is: How much subsidy from the federal government will be necessary to support an adequate program?

The hearings of the President's commission have made it clear that airplane companies will be unable without liberal government assistance to carry on the needed research and development work. This is because the sales possibilities do not justify the big investments that are necessary.

Development Costs High—Boeing Co. engineered and started construction on a feeder-line airplane known as the Model 417, but it had to shelve the project. A survey revealed that the market for this ship would not be sufficient to warrant a necessary investment of some $18 million in tooling and development.

Consolidated Vultee Model 240 twin-engined transport plane will require $11 million to develop the prototype and $14 million more will have to be spent before the first deliveries can be made. Lockheed reported an expenditure of $28 million is required to develop a large land-based transport such as the Model XB-60 Constitution. Republic has to date spent $11.8 million on development of its XF-12 Rainbow 4-engined plane—and this figure does not include government-furnished engines, propellers and other items. Republic also has spent $4.5 million on the development of a commercial adaptation of the XF-12 without having completely finished building the first ship.

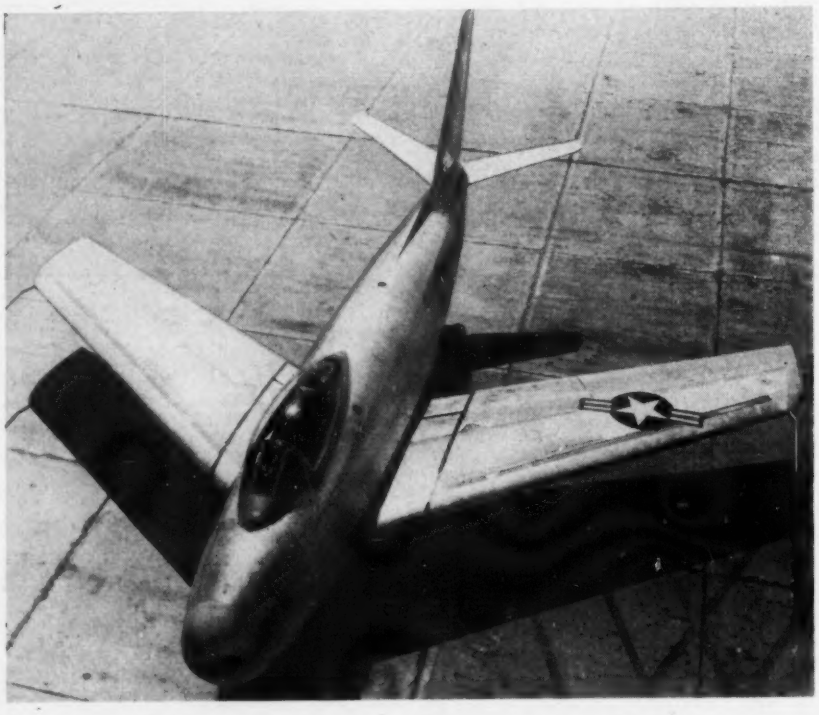
The development cost of airplanes now ranges from $146 to $320 a lb, depending upon size, design and weight of the plane. These figures apply to planes weighing all the way from 25,000 to 184,000 lb.

Weightiest evidence in the hands of the commission to date is a 247-page report made by Civil Aeronautics Board.

Assistance Needed—Civil Aeronautics Board agrees with the manufacturers that the industry cannot finance an adequate developmental program without government financial assistance. The board leaves to the Congress, and to the President's commission, the job of calculating just how much subsidy should be granted. At the same time, it is clear that the board would oppose any unlimited grants.

Airlines' Future Encouraging—The present financing difficulties of the civil airlines, says the CAB, are an inescapable aftermath of the war conditions. "The present financial difficulties will pass and the future seems encouraging if the national and international economy is not undermined by business depression, and if adequate steps are taken to assure greater regularity and safety in airplane operation."

During the two years from July 1, 1945, to July 1, 1947, the 16 domestic trunkline carriers spent $235 million for capital equipment, mostly flight equipment, "which is about eight times the total investment of these carriers in property and equipment at the beginning of 1945. During the same 2-year period, these 16 carriers



EXPERIMENTAL FIGHTER: The Army's first sweptback fighter plane, North American Aviation's radically designed XP-86, is undergoing ground and taxi tests at Muroc Army Air Base in California, in preparation for its initial flight. NEA photo

realized a net operating loss of $82,871. It is clear, therefore, that the financial strain upon the industry as a whole has resulted in large part from the outlay required for new equipment rather than from the financing of operating losses.

In other words, the position of the civil airlines, considering everything, is not so bad, and there is no reason for a "defeatist attitude." "The year 1947 finds the air carriers of the United States flying more planes to more places with more people than ever before, with greater speed, safety, and regularity than any other country in the world."

Essential for Defense—The great need of air transport for purposes of national defense, says the report, is one important reason for supporting a government subsidy program under joint civilian and military responsibility.

The report opposes a recommendation that a new Department of Transportation be set up in the government to regulate all forms of transportation.

Nazis' Cockiness Held Chief Cause of German Atom Lag

German overconfidence was the principal reason for the Nazis' failure to produce an atomic bomb, according to parallel reports by S. A. Goudsmit, head of an American mission to study this matter, and Werner Heisenberg, German scientist, in an article in the British weekly, *Nature*.

Both reports point out that in 1939 Germany was far ahead of everyone in regard to atomic research. The Heisenberg article explains the subsequent lag with an account of bureaucratic blindness, destruction of a Norwegian atomic plant and complete lack of tremendous sources of power which in the United States can be supplied by the Tennessee Valley Authority and hydroelectric plants on the Columbia river. Mr. Goudsmit, on the other hand, believes that the German scientists, themselves, were partly to blame because they arrogantly reasoned that if they couldn't develop a bomb, no one else could either.

British Metals Institute Holds Annual Fall Meeting

British Institute of Metals held its 39th annual autumn meeting last month in Glasgow. A number of metallurgical and engineering works were visited and papers were presented for discussion.

French Look Over the New Cars

Paris exhibition during October is largest ever held in that city, but models displayed were practically same as prewar. Twenty-one American makes shown

PARIS, FRANCE

THIRTY-FOURTH automobile exhibition at Paris' Grand Palais in October was the largest ever held in Paris, but it was only that, for the shiny vehicles that were exhibited were practically the same as those exhibited before the war. Main difference was that they could not be purchased now because of export regulations and shortages of raw materials.

MORE ITALIAN STEEL

Although still faced with a serious shortage of coal and coke, Italian steel industry expects its output this year to reach 1.5 million metric tons. Shortage of electric power last winter slowed output, but measures taken since then have improved the power outlook for this winter, and in anticipation of the availability of electricity two new blast furnaces will be put into operation.

Better steel supply will mean larger exports of finished steel products, which so far have consisted largely of tools, cutlery and hardware, going mainly to Switzerland, Turkey, South Africa, Argentina, Brazil and other South American countries.

Ninety French and foreign automobile manufacturers exhibited various models. One half were foreign, including 21 American makes; 25 British, 8 Italian and 2 Czechoslovakian.

Attract Attention — Two displays attracting most attention were a special Delahaye model and the miniature Rovin. The Delahaye luxury model is valued at more than 4 million frs. ($33,000). The Rovin is a small two-seater with a 2-cylinder engine mounted in the rear. It can do 100 kilometers (62 miles) on less than 5 liters (1.1 gallons) of gasoline, and its maker claims maximum speed of 75 kilometers per hour (47 miles). It is priced at 87,500 frs. ($730).

Beyond this tiny class but definitely on the small side was the Renault 4-horsepower sedan. This was one of the truly new cars in the show with a 4-cylinder rear-mounted engine capable of generating speeds of 45 miles an hour and getting about 50 miles to a gallon of gasoline. Remarkably small in appearance, the new Renault seats four passengers comfortably. It is already in assembly line production.

Another Small Car — Another innovation in the small car field is the Dyna-Panhard, a 4-passenger sedan with a 2-cylinder air cooled engine and front wheel drive. Maximum speed is 65 miles an hour.

The new 203 Peugeot, a small car modeled along American lines, was not on view at the exhibition. It has only been constructed in prototype form and the manufacturers say shortages of raw materials will hold up quantity production for many months.

France led the world in automotive construction right up to the beginning of the first world war, in 1914. Outdistanced in 1919 by the United States, in 1927 by Great Britain and in 1935 by Germany, France at the outbreak of the second world war held only fourth place in the world's automobile industry.

Production Plant Obsolete—Production in 1944 was reduced to a minimum of 10,000 vehicles. Altogether, production of passenger cars, trucks and other vehicles was 228,000 in 1938; 35,000 in 1945; 96,000 in 1946 and 71,000 in the six first months of 1947.

One of the principal causes of the weakness evident in the French automotive industry is the obsolete character of its production plant. With the same number of workers and with a quarter less machines, the General Motors Corp., for example, could produce just before the war 10 times more than the whole French industry. Hence the modernization and equipment plan (Monnet Plan) provided for the French automobile industry for 1946 to 1950 an investment amounting to $200 million, the whole to be imported from abroad. Modernization of the automobile industry according to the plan would result in a considerable increase of production. The number of man-hours of work per unit produced would gradually diminish by 50 per cent until 1951.

Production figures estimated in the plan are shown in thousands of units:

	Passenger Car	Commercial Car	Total
1st year ...	67	98	165
2nd year ...	122	125	247
3rd year ...	200	145	345
4rd year ...	290	140	430
5th year ...	350	130	480

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HYATT ROLLER BEARINGS

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Automotive profits higher in dollar volume, but below prewar years in terms of percentage of net sales. Reserves for depreciation and obsolescence being increased to partially offset higher costs of replacement

DETROIT

LOOSE talk about automotive industry profits is heard from many quarters, particularly from union officials who either deliberately or unwittingly ignore the facts of industrial life as far as money intake is concerned. Expressed in lump sums of so many dollars, profits currently being reported have a pleasant ring, but in terms of percentage of net sales they are below what the industry was able to accomplish prewar. Beyond that, it is becoming apparent that reserves set aside for depreciation and obsolescence of plant and equipment are far too low, considering present increased costs of replacement.

Chrysler Corp. in the first nine months of this year earned a net profit of 4.84 per cent on net sales of better than $989 million, representing 695,219 vehicles. In the five prewar years, 1937-41, average net profit figured to 5.48 per cent. Out of earnings a special appropriation of $5 million was earmarked to cover "special depreciation of buildings and equipment." Net profit carried to surplus represents about $69 per vehicle sold. The conclusion is obvious that despite a 16 per cent increase numerically in net sales over the 1937-41 period—and far more than that dollarwise because of terrific replacement parts sales—net profits percentagewise are down from the earlier period. The explanation is simply that prices have not kept step with greatly expanded payrolls, wages, plant facilities and higher costs of all materials.

Proportion of Output Up—The picture is much the same as reflected in the third-quarter report of General Motors. The first nine months of the year show net sales of $2,688 million, payrolls of $847 million and net income of $213 million, which makes income something under 8 per cent of net sales. Automotive share of the production covered 1,372,261 cars and trucks, or 37.6 per cent of the entire industry. GM's proportion of the industry production has been creeping up steadily throughout the year, in October, for example figuring to exactly 40 per cent.

Raise Obsolescence Allowance—Corporation officials likewise have decided additional appropriations are necessary for what they call extraordinary obsolescence of buildings and for additional depreciation on machinery and equipment. These have been made retroactive to Jan. 1 and amount to the equivalent of 35 cents per share of common stock for the nine-month period. With respect to buildings it was felt impossible to identify potential extraordinary obsolescence of any particular building and therefore the problem was approached by providing an annual amount based on the gross value of postwar additions, or $9.75 million for the first nine months, a rate of $13 million annually. With respect to machinery and equipment, the large increase in this account in the relatively short period since the end of the war created additional uncertainties as to the remaining useful life of such assets, so it was decided to revert to the practice in effect prior to 1945, whereby depreciation on machinery and equipment is accrued regardless of whether the age of any individual unit in service exceeds the estimated average useful life upon which the group rate of depreciation is based.

This is in accordance with the average group rate concept of depreciation which provides that losses on disposals charged to the depreciation reserve will be recovered over the further life of the remaining machinery in the group. The effect has been to increase provision for depreciation by $2,777,416 for the third quarter, or something over $7.7 million for nine months.

Wages Up Sharply—As was the case with Chrysler, net income of GM Divisions for the first nine months of the year did not show so great a percentage increase over the comparable period of 1941, the last prewar year, as did either sales or payrolls. Sales increased 48 per cent over 1941, payrolls increased 70 per cent, while net income increased 32 per cent. The figures confirm what all industry is beginning to realize and speculate about—the fact it is now operating in an entirely new economic weather, where storm signals may be undiscernible, financial shoals unmarked.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports

	1947	1946
January	373,872	126,082
February	399,717	84,109
March	441,798	140,738
April	449,388	248,108
May	390,629	247,620
June	418,919	216,637
July	396,932	331,100
August	360,221	359,111
September	452,068	342,969
October	459,903*	410,510
November		380,664
December		380,908
12 mos.		3,268,456

* Preliminary.

Estimates for week ended:

Oct. 25	106,159	87,680
Nov. 1	107,240	95,427
Nov. 8	105,022	92,760
Nov. 15	105,000	94,425

Trends in Body Styling

Many of the motor industry's body engineers hashed over trends on body styling and manufacturing at the recent technical convention of young and upcoming American Society of Body Engineers here recently. Sessions centered on styling, small cars, seating comfort, materials and body engineering. The styling sessions appeared to draw out most of the livelier discussion. R. H. Dietrich of Checker Cab commented on the need for "elegant simplicity" in future designs, explaining the term connoted automobiles should look like something meant for the highway, not like ocean liners or superjet planes.

Brooks Stevens, Milwaukee industrial designer who is retained by Kaiser-Frazer, listed a few styling advances now being accepted as postwar trends, pontoonside bodies (no fenders as such), shorter, sloping

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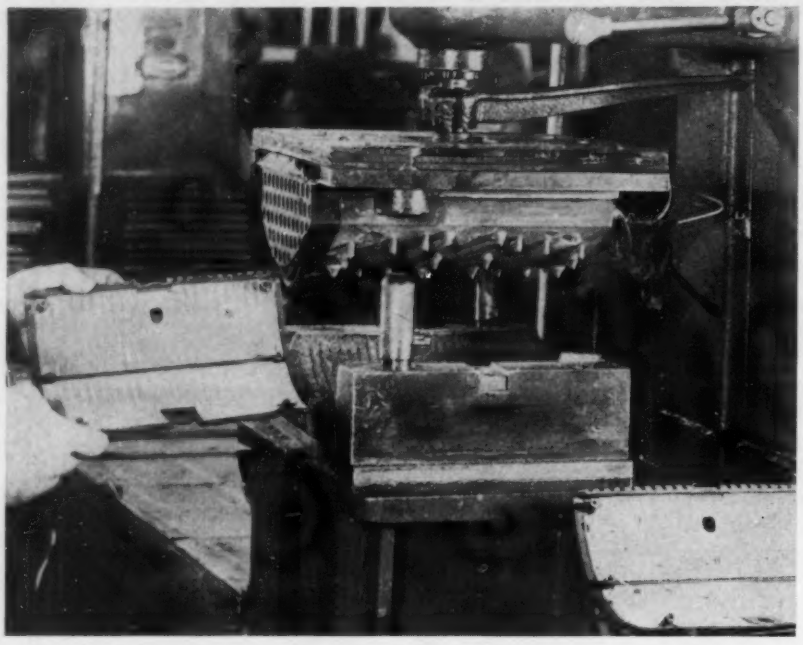


SPEEDS RADIO GRILLE OUTPUT: View above shows one of three standard hydraulic Colonial Broach bench presses currently used in the plastics plant of Ford Motor Co., to assemble metal screens to plastic radio grilles at the rate about 300 per hour. Upper die of cast iron with some 24 projecting "fingers" is electrically heated with a thermostatically-controlled resistance coil. Metal screen is merely placed over the plastic grille lying in the lower die. Upper die then moves down until the heated "fingers" press the screen into the plastic to a depth of 1/16-in., plasticizing the grille at 24 points. When the head is retracted, the completed assembly is removed and the plastic solidifies

hoods, wrap-around bumpers, simpler grilles, larger window openings and elimination of radiator ornaments. It is perhaps more than coincidence that all these features are incorporated in Kaiser and Frazer models. He warned of the increased vulnerability of the pontoonside body, saying, "we find ourselves confronted with full-width sheet metal body sides as the great crosswise extremity of the vehicle completely at the mercy of side-swiping, garage door jambs and last, but not least, the unmerciful opening of neighboring doors in the greatest body repair shop salesroom, the American parking lot." He advocated protection for these broad sheet steel sides by a three-dimensional heavy chrome molding, a fluted stainless steel lower skirt, or perhaps the laminating of hard sheet rubber to the lower third of the body side.

Walter D. Appel, chief engineer of Willys-Overland, in analyzing the so-called small car, said the country should not necessarily have smaller cars but "it would be better for our pocketbooks if we had lighter cars." He predicted American designers would not make the mistake of Europeans who boldly started with cars which proved too small for comfort, but that they would probably work downward cautiously from the present size to a small one.

"The trick of designing the small car," he summarized, "is to make it roomy inside yet small outside. It is only by establishing smaller dimensions in length, width and height that the ultimate objective—lighter weight—can be obtained. In the average car of today there is ample opportunity for reducing outside dimensions without impairing inside space."

Consider Aluminum

Substitution of aluminum for steel in motor car bodies came up for consideration by Ford's E. D. Scott, who urged designers to forget the word "substitution" and consider the problem one of permanent replacement of steel by aluminum. He said that while there are a few scattered places where units made of steel can be changed to aluminum, such as baffles or spacer panels with no value as to strength function, replacement usually calls for about a 50 per cent thickening of gage, along with the solution of manufacturing problems like handling of scrap where both metals are handled in the same department, the welding procedure, finishing and painting.

New Studebaker Out

Official announcement of the 1948 Studebaker line confirmed details listed here last week. Redesigned front grilles, bumpers and bumper guards, instrument panels and hood ornamentation, repositioning of rear shock absorbers to reduce sidesway on curves, additional needle bearings on steering knuckles, nylon upholstery on one model, and the provision of extra coil springs which may be inserted in seat cushions to provide additional support for heavier drivers head the improvements. Two new convertible models are being stepped up in production schedules.

Studebaker, incidentally, has purchased a government aircraft engine plant in South Bend, which it operated during the war.

Nash Offers New Models

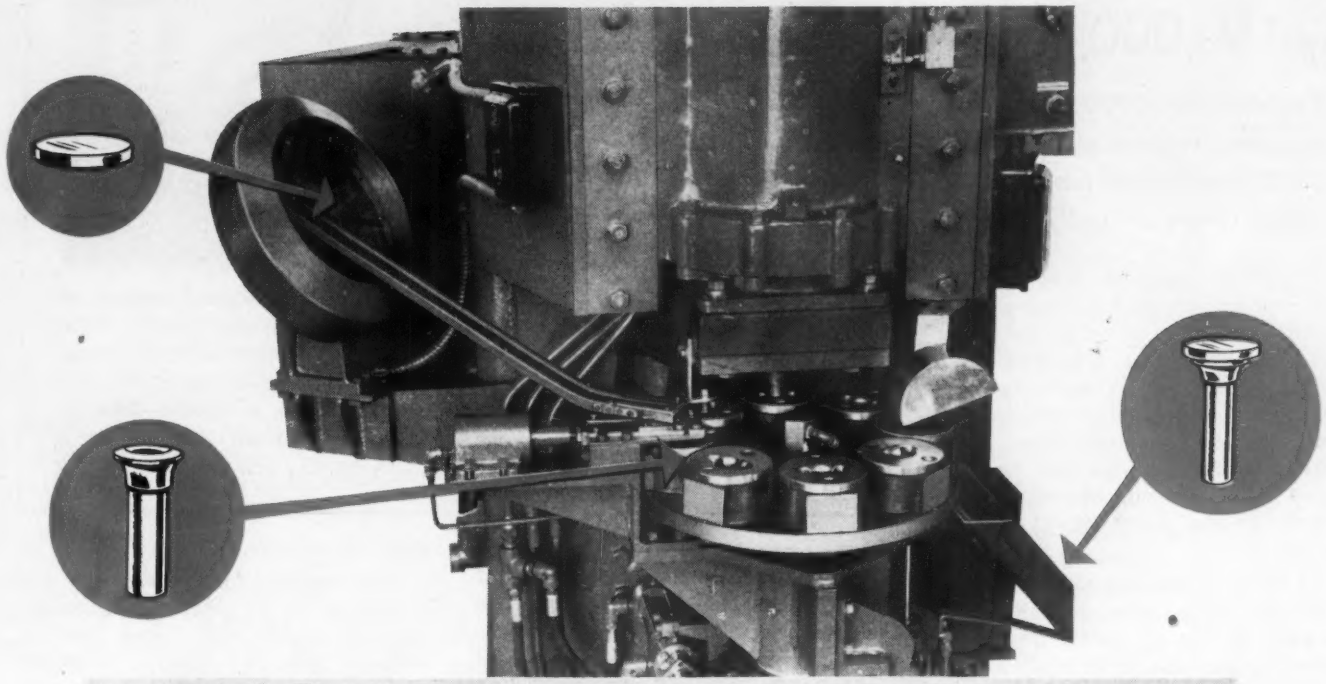
Nash also has revealed details of its 1948 series. Changes are confined to interior styling, along with a number of minor technical refinements such as improved engine mounting. Larger low-pressure tires have been adopted as standard, new color combinations are being offered and prices are increased $12 to $40.

Expand Rolling Capacity

Kaiser-Frazer is spending $600,000 on improvements to its Indianapolis Rolling Mill Division, aimed at doubling capacity. Extension of 140 ft will be added to the main mill building, 80 ft to the bar storage building. New equipment will include box-type annealing furnace, normalizing furnace with capacity of 8 tons an hour, pickling and scrubbing equipment, roller levelers and oilers, resquaring shear, 25-ton bridge crane for the mill building and 10-ton crane for the storage building. Operation of the new facilities is scheduled for early next year.

This week, K-F will add a second shift at Willow Run in the body-in-white, paint, trim and final assembly departments, requiring 1200 additional employees and bringing total employment to nearly 15,000. Afternoon-shift production at first will be limited to one assembly line and should move daily output to around 1000 per day, compared with about an 800 average before.

MODERN PRODUCTION ARITHMETIC by Federal



+ + FEDERAL WELDER = 1200 PER HOUR

UNUSUALLY HIGH PRODUCTION of over 1200 gasoline engine push rod assemblies per hour with one operator is being performed on Federal's new Automatic Dial Feed Hydraulic Projection Welder.

Operation of the machine is simplicity itself. Alloy steel discs are dumped into the motor driven hopper, the machine is started, the control panel is set and the operator manually feeds the semi-hollow, cylindrical stems into the rotating, automatic-indexing dies.

The machine does the rest; feeds discs into loaded dies, clamps discs in position, welds discs to stems and ejects completed assembly into chute. Welding is performed in a single pass.

This is another example of the time saving, profit producing possibilities of Federal Resistance Welding. Let Federal show you how special dies, jigs and fixtures can be coordinated with resistance welding to increase your production. Write today for further information, or better still, arrange a free consultation with one of Federal's qualified engineers.

THE FEDERAL MACHINE AND WELDER COMPANY
DEPT. 4117, PLANT 2, WARREN, OHIO
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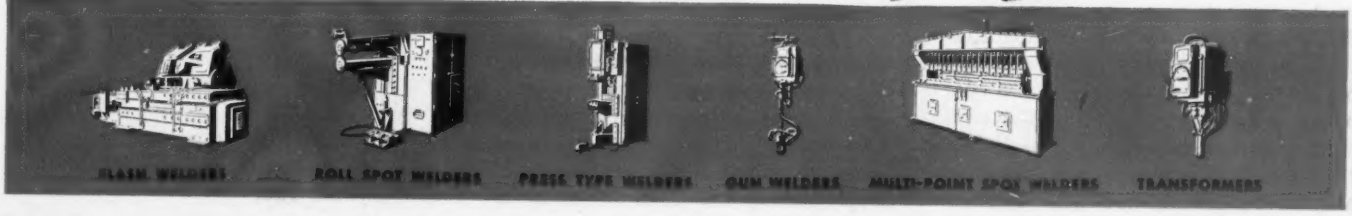

J & L To Boost Ingot Output By 150,000 Tons

Corporation's $100 million expansion program also calls for 36,000 additional tons of cold-rolled sheets annually

JONES & Laughlin Steel Corp.'s $100 million expansion program, of which $65 million is yet to be spent, will result in increased production of about 150,000 tons of ingots and 36,000 tons of cold-rolled sheets per year. Of this increased ingot total, 100,000 additional tons will be produced at Cleveland, 36,000 tons at Pittsburgh and 14,000 tons at Aliquippa, Pa.

At the corporation's Otis Works in Cleveland an additional open-hearth furnace costing $2 million will be in operation by June, 1948, while a $12,700,000 modernization project of a continuous hot strip-sheet mill will be ready by March, 1950.

Largest Expenditures — Heaviest expenditures are scheduled for the works at Aliquippa where a $12,900,000 project for a five-stand tandem cold reducing mill and strip pickling line for the production of cold reduced plate in tin plate gages is expected to be completed some time this month.

At Aliquippa the corporation is also rebuilding and enlarging No. 1 battery of by-product coke ovens at a cost of $6,989,900. This is scheduled for completion by May, 1948; while still another part of the program, construction of additional by-product and benzol recovery facilities at a cost of $3,461,000, is slated to be finished in March, 1949.

Pittsburgh's share in the program consists of an additional boiler costing $1,960,000 at the North Side central power plant which should be in operation by the end of this month, and a new central boiler plant at South Side to replace five obsolete facilities. This project will cost $4,500,000 and will not be finished until January, 1949.

Mining properties of the corporation in Washington and Fayette counties, Pa., will also be modernized. Installation of launders for partial cleaning of coal at Vesta No. 4 and No. 5 coal mines will cost $1,617,000. The new equipment is expected to be ready this month. Another rehabilitation project, to cost $17,300,000, consists of the consolidation of Vesta No. 4 and No. 5 coal mines; installation of a three-part separation coal washer for the consolidated mine; installation of waste disposal facilities; and replacement of small mine cars with vehicles of increased capacity. All this is not scheduled for completion until July, 1949.

TOOL & DIE OFFICERS: New officers elected at the recent meeting of the National Tool & Die Manufacturers Association are, left to right: Centre W. Holmberg, August W. Holmberg & Co., New York, secretary; Jerome Stanek, Stanek Tool & Mfg. Co., Milwaukee, treasurer; William R. White Jr., Midwestern Tool Co., Chicago, president; John H. Benetz, Bridge Tool & Die Works, Philadelphia, second vice president; and J. J. Kohl, International Tool Co., Dayton, O., first vice president

Westinghouse Achieves New Peacetime Output Records

Production of the Westinghouse Electric Corp., Pittsburgh, hit a new peacetime high of $492,179,242 in net sales billed for the first nine months of 1947, President Gwilym A. Price has announced. Net sales billed for the third quarter of this year were $179,840,606.

Despite this record production, shipments during the first nine months of this year were approximately $152 million less than the volume of new orders received; but Mr. Price pointed out that if certain special military orders were excluded, unit production in the past six months has actually exceeded new orders. Shipments now are running at an annual rate of almost $800 million, compared with the rate of $407,500,000 for this time last year.

Basic Refractories Begins Operation of Rotary Kiln

Doing its part to supply commodities necessary to increase production of steel, Basic Refractories Inc., Cleveland, recently put into operation a new rotary kiln for production of dead burned dolomite at its Maple Grove, O., plant. The kiln is capable of producing 450 tons of basic refractory per day.

Raw material for processing in the kiln, and the 10 others the company operates on the site, comes from an adjacent dolomite quarry, estimated to contain an ample supply of the rock for another 60 years' operation. Crushed to size, it is fed into the kiln in two sizes and is heated by powdered coal blown into the kiln at high velocity with great quantities of air. Heating expels all carbon dioxide.

After treating with a light tar to prevent hydration and disintegration, the refractory is conveyed to storage, from which it is shipped in compartmented freight cars or packed in bags.

Capacity of the plant is 1800 tons per day of finished refractories and approximately 2200 tons of raw stone, metallurgical stone and agricultural limestone. Increase in capacity since before the war is said to approximate 75 per cent.

Triple Mill Supply Meeting Slated for Newark, Nov. 19

Second in a series of five regional Triple Mill Supply conferences will be held Nov. 19 at the Robert Treat Hotel, Newark, N. J. Speakers include Ralph M. Johnson, vice president and general sales manager, Abrasive Division, Norton Co., Worcester, Mass.; G. H. Boucher, vice president, Pyrene Mfg. Co., Newark; R. P. Melius director of sales, Delta Mfg. Co., Milwaukee; P. W. Evans, secretary, Beals, McCarthy & Rogers Inc., Buffalo; and W. W. French, director of sales promotion, Dodge Mfg. Corp., Mishawaka, Ind.

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Robins Conveyors Division, Hewitt-Robins Inc., Passaic, N. J., has appointed St. Louis Railway Supply Co., St. Louis, as a distributor of Robins materials handling equipment in the general St. Louis area.

—o—

Indiana Steel Products Co., Chicago, maker of permanent magnets, has purchased Cinaudaugraph Corp., Stamford, Conn., and will move the firm's operation to Indiana's plant in Chauncey, N. Y.

—o—

Bendix Home Appliances Inc., South Bend, Ind., produced approximately 79,000 units in October. Output of washers, dryers and ironers reached new high.

—o—

Wadsworth Equipment Co., Wadsworth, O., formerly known as Wadsworth Core Machine & Equipment Co., has announced completion of reorganization that began in April of last year. Firm manufactures foundry equipment and supplies. E. A. Allan is president of the company.

—o—

Cornell University, Ithaca, N. Y., has established an endowed professorship of metallurgical engineering named for Francis N. Bard, owner of Barco Mfg. Co., Chicago, who gave a $250,000 fund for the professorship.

—o—

Peerless Foundry Co., Indianapolis, has formed Round Oak Co. Inc., as a subsidiary to handle inventory, patterns and trade name of the former Dowagiac, Mich., firm bought by Peerless. Round Oak's foundry facilities in the Michigan city were sold to Kaiser-Frazer Corp. earlier this year.

—o—

American Rolling Mill Co., Middletown, O., has purchased for $250,000 an alloy steel plant at Middletown from WAA which was built during the war to augment existing facilities of the company.

—o—

General Electric Co., Schenectady, N. Y., has formed Welding Equipment Division as one of the integrated operating units within GE's Apparatus Department.

—o—

Schaible Co., Cincinnati, manufacturer of plumbing fixtures and valves, has purchased manufacturing facilities of General Tire & Rubber Co., Plumbing Division, with a plant at Pasadena, Calif., and the entire business, including equipment and inventory of Cincinnati Faucet Co. with a plant in Cincinnati. Inventory of General Tire's Plumbing Division has been purchased by Commodore Faucet Co., Chicago.

—o—

H. H. Robertson Co., Pittsburgh, manufacturer of construction materials, has appointed Puget Sound Sheet Metal Works, Seattle, as its sales agent.

—o—

Farm Bureau Co-operative Association, Columbus, O., predicts that farm fence and other farm steel items will continue to be short for about one year.

—o—

American Ceramic Society, Pittsburgh Section, announces establishment of the Albert Victor Bleininger Memorial Award for distinguished achievement in the field of ceramics.

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Lukens Steel Co., Coatesville, Pa., recently was host to more than 300 representatives from the pulp, paper, chemical and petroleum industries who visited the Lukens facilities.

—o—

Koppers Co. Inc., Pittsburgh, reports that five members of the British Coke Research Association recently conferred with Koppers officials for a final review of investigations made while visiting coke oven installations designed and constructed by Koppers.

—o—

War Assets Administration is offering metals and metal products with total acquisition value of more than $445,000 to the government in sales at its Hammond, Ind., warehouse beginning Nov. 28.

—o—

Syntron Co., Homer City, Pa., manufacturer of vibratory materials handling equipment and portable construction and maintenance tools, has purchased the former H. K. Porter Co., shell plant at Blairsville, Pa. Syntron will produce its large feeders and conveying equipment in the 100,000 sq ft facilities.

—o—

American Foundrymen's Association, Chicago, has begun its 24th annual national apprentice contest in which i n d e n t u r e d apprentices throughout the United States and Canada will match skills in iron, steel and nonferrous molding and patternmaking.

—o—

Allied Chemical & Dye Corp., New York, announces its General Chemical Co., Solvay Process Co. and Solvay Sales Corp. have been merged into the parent company to become General Chemical Division, Solvay Process Division and Solvay Sales Division, respectively, with no change in personnel.

—o—

Van Bergen Bell, Chimes & Carillon Co., Heiligerlee, Netherlands, expects to start production in Greenwood, S. C., at a new branch bell foundry as soon as sufficient quantities of tin can be located. Other branches of the firm are located at Bilthoven, Netherlands; Soeraaja, Netherlands East Indies; and Pretoria, Union of South Africa.

—o—

Vanadium-Alloys Steel Co., Latrobe, Pa., announces that its die steel called Speed-Cut is now available in the following sizes: Widths up to 20 in.—1 in. to 8 in. thick; widths from 20 to 30 in.—1 in. to 5½ in. thick; widths from 30 to 32 in. —2 in. to 4½ in. thick.

—o—

Westinghouse Electric Corp., Pittsburgh, will install lampmaking machinery in its new plant in Little Rock, Ark., in December and initial production is scheduled for January.

—o—

Cleveland Chamber of Commerce reports that current employment of 212,500 in Greater Cleveland is only 5½ per cent below levels at the end of the war and is 20 per cent above the reconversion low of late September, 1945.

—o—

Lincoln Electric Co., Cleveland, reports that the Tax Court in compliance with a recent decision of the Sixth Circuit Court of Appeals has rescinded its order that Lincoln pay profit taxes on sums awarded its employees by its profit-sharing plan.

—o—

Reeves-Ely Laboratories Inc., New York, manufacturer of electronic devices, radio and communications equipment and household appliances, has purchased Waring Products Corp., maker of household appliances. Reeves-Ely, a subsidiary of Claude Neon Inc., had previously owned 50 per cent of the Waring Stock.

—o—

Southern Research Institute, Birmingham, reveals that for the first eight months of this year its volume of research work totaled $192,642, an increase of 52 per cent over the same period last year.

The Business Trend

Production Pace Slips Below Postwar Record

OCTOBER industrial activity, at about 166 per cent of the 1936-1939 average, set a new postwar record with sustained high output in almost all basic industries. A slight decline in the rate of industrial operations which occurred in the week ended Nov. 8 eased STEEL's index down one point from the preceding week to 167 per cent of the base prewar period. This rate, however, has been exceeded only twice since the war's end.

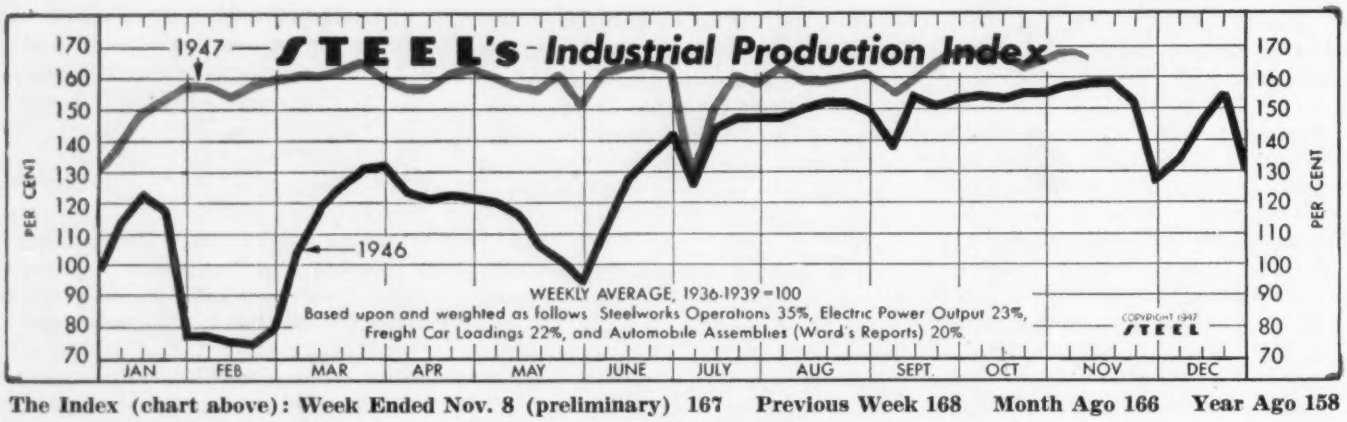
EMPLOYMENT—Contrary to seasonal trend, employment in October was 300,000 more than in September and with 59,200,000 people at work was close to the all-time high achieved this summer when hiring of seasonal farm workers and students on vacation from studies boosted the total to over 60 million, according to the Census Bureau. Ewan Clague, commissioner of Labor Statistics, recently reported that in addition to the record number of people now at work they are being used at higher skill levels than they were before the war.

PRICES—Led by food prices, which decreased 1.4 per cent to the lowest point in two months and were only 4.8 per cent above a year ago, wholesale prices for all commodities in the week ended Nov. 1 were 0.4 per cent below the previous week. Increases were reported by the Bureau of Labor Statistics for petroleum products, bituminous coal, crude rubber, lumber and cement during the week, but industrial raw materials as a whole declined 0.6 per cent and manufactured products were down 0.4 per cent from the previous week.

COAL OUTPUT—Production of almost 13 million net tons of bituminous coal during the week ended Nov. 1 was the highest since the week of June 21, 1947, the Office of Defense Transportation has announced. The present coal supply situation throughout the East and Midwest is expect to "materially improve" as a result of recent boosts in output and as soon as 60,000 coal cars are released at the close of the Great Lakes navigation season.

RAILROADS—Net railway operating income of $47,979,446 was received by Class I railroads in September, compared with $67,510,230 in the same month of 1946, the Association of American Railroads reports. These railroads' net income after interest and rentals is estimated at $21,150,000 for the month, compared to $39,800,000 in September, 1946. For the first nine months of the year, however, net income is estimated at $316 million, compared with $105 million in the corresponding period of 1946.

STOKERS—Factory sales of mechanical stokers increased in September to 10,208 units, 8 per cent more than were sold in August, the Department of Commerce announces. The September total, however, was 49 per cent below that of September, 1946.



The Index (chart above): Week Ended Nov. 8 (preliminary) 167 Previous Week 168 Month Ago 166 Year Ago 158

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	93.0	96.5	95.5	91.5
Electric Power Distributed (million kilowatt hours)	4,990‡	5,009	4 958	4,682
Bituminous Coal Production (daily av.—1000 tons)	2,140	2,106	2,032	2,110
Petroleum Production (daily av.—1000 bbl.)	5,240	5,274	5,245	4,779
Construction Volume (ENR—Unit $1,000,000)	$97.3	$82.2	$97.0	$53.0
Automobile and Truck Output (Ward's—number units)	105,022	107,240	98 973	92,760

* Dates on request. ‡ Preliminary. † 1947 weekly capacity is 1,749,928 net tons. 1946 weekly capacity was 1,762,381 net tons.

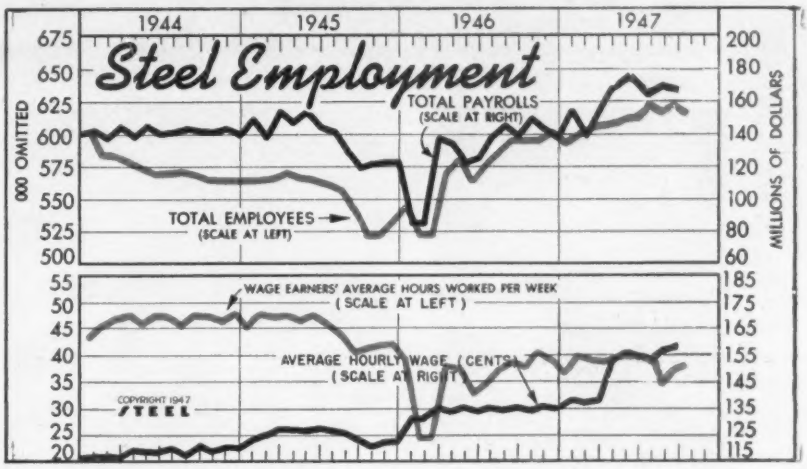
TRADE				
Freight Carloadings (unit—1000 cars)	935†	941	957	913
Business Failures (Dun & Bradstreet, number)	72	70	62	25
Money in Circulation (in millions of dollars)‡	$28,635	$28,519	$28 632	$28,750
Department Store Sales (change from like wk. a yr. ago)‡	+14%	+7%	+18%	+17%

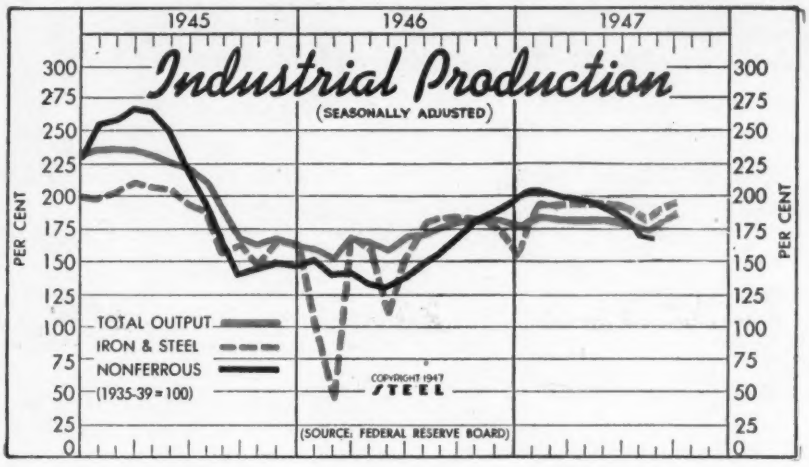
† Preliminary. ‡ Federal Reserve Board.

Steel Employment

	Employees† (000)		Total Payrolls (millions)		Hourly Wage† (cents)	
	1947	1946	1947	1946	1947	1946
Jan.*	601	522	$155.8	$84.9	138.1	131.4
Feb.*	607	522	139.5	84.9	137.0	131.4
Mar.	609	570	150.6	138.8	137.9	135.1
April	611	582	165.3	134.3	153.3	134.1
May	615	563	175.8	121.4	155.6	135.8
June	623	578	167.6	125.6	154.7	134.4
July	623	585	163.2	138.0	153.9	135.1
Aug.	625	596	169.1	145.2	155.6	134.6
Sept.	618	596	168.9	139.6	157.1	136.2
Oct.	...	596	....	150.6	....	134.1
Nov.	...	600	....	143.4	....	136.7
Dec.	...	594	....	137.2	....	135.2

†Monthly average. *Figures for January and February, 1946, are merely averages derived from a report that combined those two strike-affected months.





Federal Reserve Board's Production Indexes

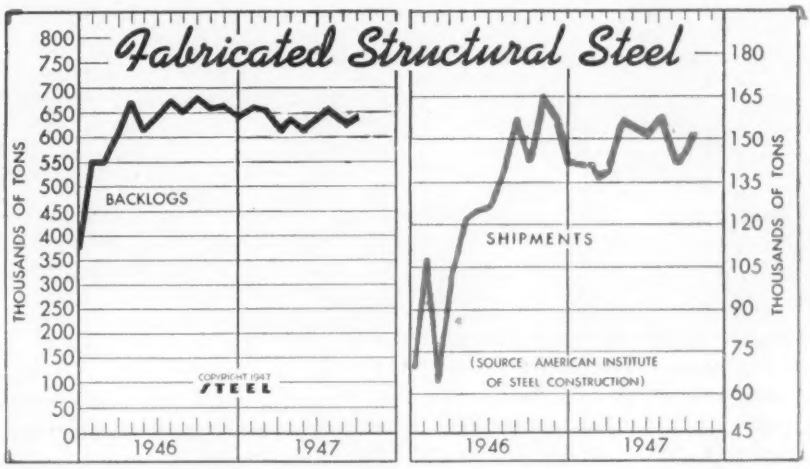
(1935-39=100)

	Total Production		Iron, Steel		Nonferrous	
	1947	1946	1947	1946	1947	1946
Jan.	189	160	192	102	204	150
Feb.	189	152	191	43	205	141
Mar.	190	168	196	169	199	139
Apr.	186	165	195	159	197	132
May	185	159	197	109	187	128
June	184	170	193	154	179	137
July	177	172	181	180	172	151
Aug.	182	178	188	184	171	159
Sept.	185	180	194	185	...	172
Oct.	...	182	...	184	...	184
Nov.	...	183	...	178	...	192
Dec.	...	182	...	159	...	197
Ave.	...	171	...	150	...	157

Fabricated Structural Steel

(000 Tons)

	Shipments			Backlogs		
	1947	1946	1945	1947	1946	1945
Jan.	140.6	107.5	57.0	661	552	124
Feb.	136.1	63.8	49.0	656	551	152
Mar.	137.8	102.8	59.5	614	605	153
Apr.	157.4	122.5	62.8	632	674	163
May	155.0	124.4	72.6	628	615	166
June	151.9	126.8	69.2	634	642	195
July	156.7	140.2	69.9	661	674	194
Aug.	144.9	157.5	70.6	639	651	201
Sept.	151.0	141.9	63.4	648	682	248
Oct.	....	164.7	76.6	...	660	283
Nov.	....	157.3	78.0	...	665	305
Dec.	....	142.1	68.8	...	646	375
Total	....	1,551.6	797.4	...	...	...



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$12,830	$13,272	$13,258	$11,888
Federal Gross Debt (billions)	$258.8	$259.0	$259.8	$261.9
Bond Volume, NYSE (millions)	$16.3	$21.3	$21.9	$22.6
Stocks Sales, NYSE (thousands)	3,664	5,484	5,256	6,530
Loans and Investments (billions)†	$65.0	$65.0	$64.8	$58.6
United States Gov't. Obligations Held (millions)†	$38,192	$38,632	$38,400	$39,044

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$76.09	$75.41	$75.41	$64.45
All Commodities†	157.4	158.0	157.1	134.8
Industrial Raw Materials†	175.9	177.0	172.9	150.9
Manufactured Products†	150.0	150.6	151.4	130.4

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

JOHN T. BRITTAIN

JERRY SINGLETON

W. D. HESS

John T. Brittain has been appointed manager of sales of California Wire Cloth Corp., a subsidiary of Colorado Fuel & Iron Corp., at Oakland, Calif. He has been with the Colorado Fuel & Iron Corp. since 1937, when he became a salesman for the Oklahoma office. He served as district sales manager in the Wichita, Kans., office, and later in the Lincoln, Nebr., office, and in March, 1947, was promoted and transferred to Denver as division sales manager. In October, 1947, he was again promoted and made manager of sales for wire products in the general offices. He is succeeded in the latter position by **Howard J. Davis,** who has been manager of product research and development for the Western Division of the company.

—o—

Leicester L. Lewis, vice president, Tabor Mfg. Co., Philadelphia, has been named director of sales of the company. **Robert M. Maull,** long associated with the company's sales policies, will now exclusively devote all his time to his position of treasurer and comptroller, which functions have been greatly expanded.

—o—

Walter G. Tucker has been elected chairman of the board of Hydraulic Press Mfg. Co., Mt. Gilead, O. He succeeds **Col. H. A. Toulmin Jr.,** who has resigned as chairman, and also as president and general manager of the company, and who will now devote his time to practice of corporation law at Dayton, O. Mr. Tucker now resumes the responsibilities which he carried from 1933 to 1945, following 17 years as president of the company. **Paul C. Pocock,** formerly vice president in charge of sales, will assume active direction of the company's operations as executive vice president and general manager. **Warren R. Tucker,** who has been vice president of Commonwealth Engineering Co., Dayton, has been elected to fill the newly created post of vice president in charge of engineering and research.

—o—

Jerry Singleton has been appointed assistant to the president, Pressed Metal Institute, Cleveland. He has had more than 20 years' experience in contact work with trade associations, and will assist in organizing new district groups and in securing new members.

—o—

Charles H. Stamm has been elected to the board of directors of International Detrola Corp., Detroit. Mr. Stamm is a vice president and is general manager of the company's Newport Rolling Mill Division, which includes open hearths at Wilders, Ky., rolling mills and steel fabrication at Newport, Ky., a blast furnace in Martins Ferry, O., and a coal mine in Perry county, Ky.

—o—

Paul B. Reeves has been named president of Reeves Pulley Co., Columbus, Ind., to fill the vacancy caused by the recent death of his uncle, **G. L. Reeves. Kenneth M. Snively,** company controller, has been elected to the board of directors. **Carl M. Reeves** has been elected president of Reeves Pulley Co. of New York Inc., also succeeding the late Mr. Reeves, his uncle.

—o—

Herbert Dobkin, formerly associated with M. W. Kellogg Co., New York, has become a partner in Ace Heat Treating Corp., Elizabeth, N. J., which specializes in various metal treating operations, and engages in consulting metallurgy and engineering.

—o—

A. C. Horn Co. Inc., Long Island City, N. Y., subsidiary of Sun Chemical Corp., announces the appointment of **W. D. Hess** as district manager of its new offices and warehouse recently opened at 310 Lakeside Ave., Cleveland. For the past 10 years, Mr. Hess has been associated with the Industrial Battery Division, Philco Corp., Philadelphia.

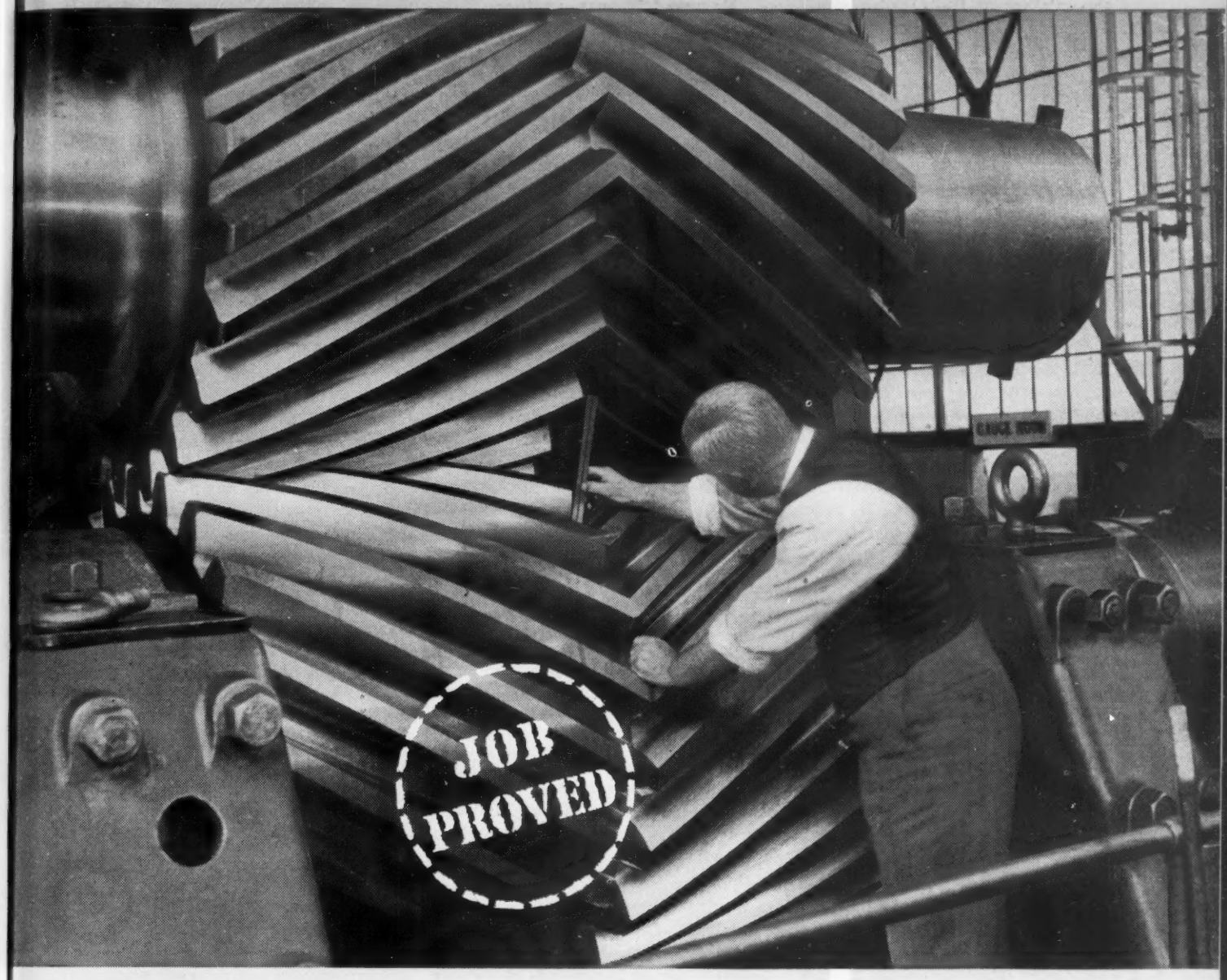
—o—

Albert W. Scarratt, vice president in charge of engineering and patents for International Harvester Co., Chicago, has retired after more than 20 years' service with the company. He joined International Harvester in 1927 as chief engineer of motor trucks and coaches, and was promoted to chief of automotive engineering in 1935. A year later he was made assistant to the vice president, and in 1939 was elected vice president. **A. E. W. Johnson,** formerly manager of engineering for the company's Farm Implement Division, has been appointed director of engineering, and will assume, in general, the duties formerly under the supervision of Mr. Scarratt.

—o—

H. K. Poffenberger has been appointed central region sales manager of the Buick Division of General Motors Corp., Detroit. Until recently zone manager at Philadelphia, Mr. Poffenberger succeeds **C. C. Edmonds,** who resigned to accept a Buick dealership at Cleveland. Mr. Poffenberger will have headquarters at

Production Up 22% on 44-Inch Pinion Gears



SUNICUT . . .

Enables Gear Manufacturer to Increase Feed, Speed, and Tool Life; and to Improve Finish

Since changing to Sunicut, a manufacturer of steel-mill gears has increased production by 22%, improved finish, and added greatly to the life of his gear cutters.

Operation: Cutting 44" herringbone gears.
Machine: Dominion herringbone gear generator.
Materials: Stainless steel, high carbon steel, bronze, other alloys.
Cutting Oil: Sunicut.

This case is just one of thousands in which experienced production men have found that Sun "Job Proved" cutting oils help to increase production and to improve quality as well.

Sunicut is a clear, free-flowing cutting oil, produced by an exclusive Sun process. It has high lubricating value and has excellent heat-dissipating and anti-weld properties. It makes possible heavy cuts at high speed while accuracy and satin-smooth finish are maintained. For full information call your Sun Cutting Oil Engineer or write Department S11.

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INDUSTRIAL PRODUCTS

Flint, Mich. He has been associated with Buick since 1940, serving as district sales manager at Dallas, Tex., and as Buick zone manager at El Paso, Tex., and Washington, before his appointment at Philadelphia. Mr. Edmonds has been Buick central region manager since 1939.

—o—

James M. Brophy Jr. has been named purchasing agent of the Blackhawk Mfg. Co., Milwaukee. He has been assistant purchasing agent. Mr. Brophy joined the company two years ago.

—o—

Edward E. Lewis has been elected president of Colonial Radio Corp., Buffalo, subsidiary of Sylvania Electric Products Inc. **Don G. Mitchell,** president of Sylvania, has been serving also as head of Colonial. Mr. Lewis formerly had been executive vice president of the radio firm.

—o—

W. C. Newberg has been named president of the Airtemp Division, Chrysler Corp., at Dayton, O. He succeeds **D. W. Russell,** who is retiring to form his own company.

—o—

William G. Hass has been appointed Great Lakes regional sales manager, Crosley Division, Avco Mfg. Corp., Cincinnati. He previously had been connected with Buckeye Broadcasting Co., division of Marshall Field Radio, Chicago.

—o—

J. H. Kelly, southeastern district manager, Farnsworth Television & Radio Corp., Fort Wayne, Ind., has been appointed manager of the Sales Division. He is succeeded in the southeast by **George E. Worden.**

—o—

Thomas R. Moore, General Aniline & Film Corp., Binghamton, N. Y., and **George H. Tully,** Metals Refining Co., Hammond, Ind., have been elected to the board of the Metal Powder Association.

—o—

Vernon L. Turner, after 17 years as traffic manager of Sloss-Sheffield Steel & Iron Co., Birmingham, has resigned to accept the position as assistant traffic manager with the George Cochran Traffic Bureau, Birmingham.

—o—

Lustron Corp., Columbus, O., announces election of the following as directors of the company: **Joseph E. Nolan,** partner, Bell, Boyd & Marshall; **Raymond Hurley,** vice president, Thor Corp.; **Louis Leverone,** president, Automatic Canteen Co. of America; and **Howard E. Buhse,** partner, Hornblower & Weeks, all of Chicago; **George Delp,** president, New Holland Machine Co., New Holland, Pa.; **Paul O. Buckley,** director, Federal Machine & Welder Co., Warren, O.; and **Raymond Haynes,** partner, Wellington & Co., New York.

—o—

The Cold Metal Products Co., Youngstown, producer of precision cold rolled strip steel, announces personnel changes in its sales organization as follows: **Frederick C. Shotwell,** formerly with Republic Steel Corp., Cleveland, has joined the Detroit sales force of Cold Metal Products Co. **Samuel M. Marshall** has been transferred to the New England Sales Division of the company, with headquarters in Hartford, Conn.

—o—

Thomas D. Hess has been appointed assistant open hearth superintendent of the Midland, Pa., works of Crucible Steel Co. of America, New York. He has been connected with Bethlehem Steel Co. at Steelton, Pa., for 10 years in the open hearth department.

—o—

Studebaker Export Corp., South Bend, Ind., announces assignment of **Dewey W. Smith,** its first vice president, to supervision of Latin American markets. Mr. Smith has been in charge of Indian and Far Eastern Divisions of the firm.

—o—

Floyd G. Sease has been appointed an assistant sales manager of Nash Motors Division, Nash-Kelvinator Corp., Detroit. Mr. Sease joined Nash in 1945 as business management manager.

—o—

Lisle R. Beardslee has retired as secretary of General Motors Corp., Detroit. He is succeeded by **George A. Brooks,** who has also been named secretary of the financial policy committee.

—o—

H. D. Kelsey has been named manager of the newly created Aircraft Gas Turbine Divisions, General Electric Co., Schenectady, N. Y. He will have charge of jet engine and turbosupercharger engineering, manufacturing and sales.

—o—

The Michigan Chapter of Institute of Scrap Iron & Steel Inc., has elected the following officers: President, **H. R. Nathan,** Gendelman & Nathan Iron & Metal Co., Detroit; first vice president, **Edward Elk,** Kazle Bros. Inc., Flint, Mich.; second vice president, **Richard Orloff,** Kramer-Orloff Co., Detroit; secretary, **Norman Siegel,** Siegel Iron & Metal Co., Detroit; treasurer, **Joe Newman,** Warren Iron & Metal Co., Detroit.

—o—

The following were elected officers of the Indiana Chapter of the Institute of Scrap Iron & Steel Inc.: President, **Meyer Ruchman,** Indiana Rolling Mill Baling Corp., Fort Wayne, Ind.; vice president, **Samuel Hurwitz,** Hurwitz Iron Co. Inc., South Bend, Ind.; secretary-treasurer, **Harry A. Alpert,** J. Solotken & Co. Inc., Indianapolis.

—o—

Milton C. Sarran has been appointed manager of sales for the Warehouse Division, Atlantic Steel Co., Atlanta. He has been with the company for 14 years, as district sales manager in large industrial territories.

—o—

Peter F. Hurst, executive vice president and general manager of Aeroquip Corp., Jackson, Mich., has been elected president and director of Eltron Inc., of Jackson. Eltron is engaged in the development and manufacture of electronic products.

—o—

Dr. H. E. McGuire, chief surgeon for Jones & Laughlin Steel Corp., Pittsburgh, since 1912, has retired. He is succeeded by **Dr. Scott A. Norris,** who has been assisting Dr. McGuire for many years. **J. G. Littell,** real estate agent, also retired from the organization, and is succeeded by **D. S. Donkin,** who has been assistant real estate agent. Mr. Donkin's new title is manager of real estate and insurance.

—o—

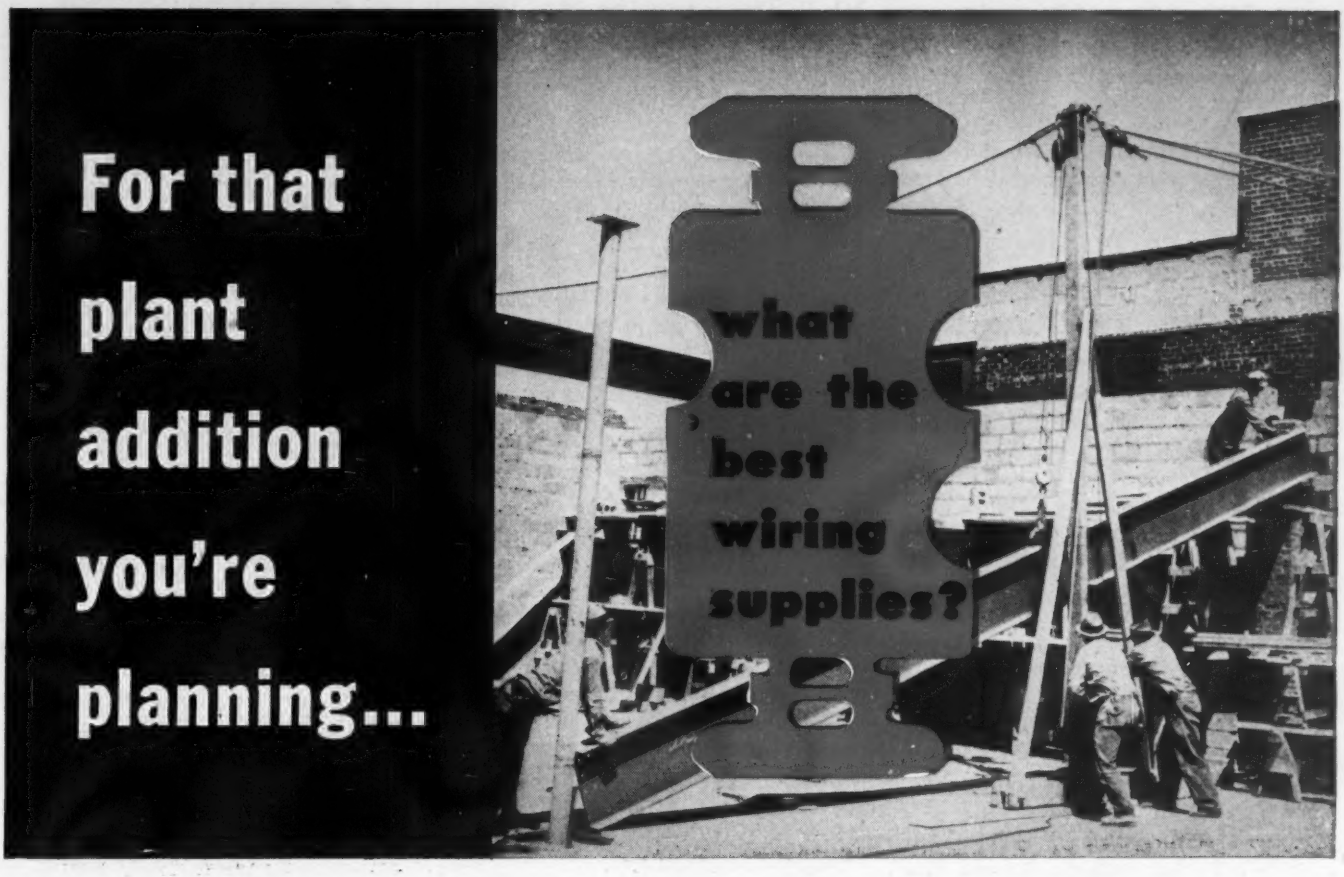
Copperweld Steel Co., Glassport, Pa., has appointed **T. R. Snedden** as maintenance engineer. He has had experience in maintenance work with the National Tube Co., and the Mathews Conveyor Co., both of Ellwood City, Pa.

—o—

Herbert J. Kettler, formerly in charge of service engineering in the Chicago area for Hagan Corp., Pittsburgh, has been transferred to St. Louis to assist **J. C. McFarland,** manager of the firm's St. Louis office. **Gerald G. Lipke** has been transferred from Denver, to the Hagan-Hall-Calgon staff in Pittsburgh, and the corporation has also assigned **Robert L. Hankison,** former member of the Pittsburgh engineering department, to sales.

—o—

Fairbanks, Morse & Co., Chicago, announces the following changes in its sales organization: **J. C. Elm-**



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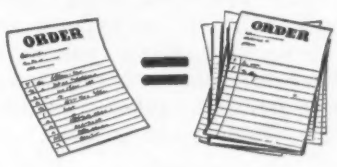
It's a good idea to have Graybar work with you in planning *any* wiring job. Graybar knows wiring — all kinds — and distributes carefully selected makes of wire, cable . . . busduct, conduit, raceways . . . fittings for all wiring systems . . . connectors, wiring devices, panels, fuses . . . primary equipment . . . specialized tools. The near-by Graybar Inside Construction Specialist can help you or your electrical contractor choose the best combination of conductors and supplies for any installation.

Our national warehousing system can simplify your job of getting "everything electrical". Although it's impossible for us to maintain complete stocks today, many items are available for immediate delivery. Call our nearest office. *Graybar Electric Company. Executive offices: Graybar Building, N. Y. 17, N. Y.*



How Graybar simplifies your electrical buying

Graybar makes it possible for you to obtain — from a single convenient source — more than 60,000 electrical items, made by over 200 leading manufacturers. Through its 95 offices and warehouses, Graybar shortens the economic distances between 200 makers and 35,000 users. One order, one responsibility, one invoice does the work of many.

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burg of the company's Boston branch has been transferred to the branch in Atlanta, to assume the position of manager of that area. He succeeds **G. N. Van Epps,** who recently resigned. **V. O. Harkness,** who has been manager of the Diesel Division at Chicago, has been appointed manager of the Boston branch, and **T. M. Robie** of Chicago has been appointed to the position of manager of the General Diesel Sales Division.

—o—

F. R. Hook has been appointed resident manager of the Euclid plant of Fisher Body Division, General Motors Corp., at Cleveland. This plant was recently acquired for expanded station wagon body production. For the past two years he has been resident manager of the Hamilton, O., plant, on which construction work now is nearing completion. He is succeeded there by **Sidney J. Sabourin,** who has been plant superintendent of the Fabricating Division of the Flint, Mich., plant No. 1.

—o—

C. O. Miller, director of the purchasing and salvage section of the manufacturing staff of General Motors Corp., Detroit, has left that position to handle special assignments. He is one of the oldest employees in point of service of any in General Motors, being first employed by the Olds Motor Works in Lansing, Mich., in 1902. **H. L. Dingler,** director of the industrial engineering section, has succeeded Mr. Miller as head of purchasing and salvage, and **Paul A. Switzer** has taken over Mr. Dingler's former duties as director of the industrial engineering section.

—o—

Clyde L. Hassel has been appointed vice president in charge of sales and engineering, Pittsburgh Steel Foundry Corp., at Glassport, Pa. He succeeds **E. S. Weidle,** who has resigned. Mr. Hassel has been connected with the corporation since 1924.

—o—

Coulter-Sibbett Steel Co., New York, announces that **John O. Fry** has become a partner of the firm.

—o—

W. C. Bennett, formerly in charge of engineering service in the St. Louis area for Hall Laboratories, Pittsburgh, has been named district engineer for the company, covering the area comprising Colorado, western Texas, Utah, New Mexico and Wyoming. He will make headquarters in Denver with the Denver Fire Clay Co., which represents the parent firm, Hagan Corp., and its associated companies. Mr. Bennett succeeds **Gerald G. Lipke,** who has been transferred from Denver to the Pittsburgh sales area.

—o—

Kellen Wiles has been appointed executive assistant to the general manager of the Sturtevant Division, Westinghouse Electric Corp., at Hyde Park, Mass.

—o—

B. W. Mitchell has been appointed manager of sales for the Oregon Division of Columbia Steel Co., subsidiary of U. S. Steel Corp.

—o—

Ernest R. Schmidt has been appointed plant manager of the Hunting Park Plant, Budd Co., Philadelphia. He has been associated with the company since 1917.

—o—

Harold F. Howard, for many years associated with the Chevrolet Division of General Motors Corp. at Indianapolis, Baltimore and Flint, Mich., and later active with Fruehauf Trailer Co., Detroit, has formed his own organization of management consultants known as the Harold F. Howard Co., with offices in the Fisher Bldg., Detroit. He will furnish functional management consultation to large and small businesses on all phases of their operations.

—o—

William M. Lee has joined the research and development department of Pennsylvania Salt Mfg. Co., Philadelphia, as supervisor of the Special Products Division.

—o—

G. L. Hartman, formerly of Firestone Tire & Rubber Co., Akron, has been appointed general sales manager of Belmont Radio Corp., Chicago.

—o—

Ernest Hookway has been appointed operating manager of the recently created Plastic Materials Sales Division, B. F. Goodrich Co., Akron. For the past two years he has been a senior development man in the Industrial Products Division.

—o—

General Machinery Division of Allis-Chalmers Mfg. Co., Milwaukee, announces formation of a fifth region, designated as the Empire region, which embraces territory now covered by New York, Buffalo, Rochester, Syracuse and Newark offices. The Rochester and Syracuse offices, formerly branch offices under the Buffalo district office, and the Newark office, formerly a branch of the New York district office, automatically assume district office status under the regional plan. **Arch J. Cooper** has been named manager of the Empire region, and continues as New York district office manager in addition to regional manager. **Vernon L. Spinney,** formerly New York petroleum sales representative, has been appointed assistant district office manager. **William J. Devers,** formerly public utilities sales representative in the New York district office, has been named Newark district office manager, and **Ned W. Landis,** manager, Syracuse office, becomes a district manager. **H. E. Weiss** and **Robert G. Burns** continue as district manager of the Buffalo office and as special representative of the Rochester office, respectively.

WILLIAM B. PROSSER

Who has been appointed general manager of the Perfect Circle Corp., Hagerstown, Ind. Noted in STEEL, Nov. 10 issue, p. 96

—o—

Archibald M. Brown Jr. has been appointed general sales manager of Edo Aircraft Corp., College Point, N. Y.

—o—

H. W. Vine, formerly general sales manager, Carver Pump Co., Muscatine, Iowa, has been appointed manager of the industrial field of Gorman-Rupp Co., Mansfield, O., pump manufacturer.

—o—

Joseph P. Shaw has been appointed assistant sales manager of Stinson Division, Consolidated Vultee Aircraft Corp., Wayne, Mich.

—o—

David J. Davies, formerly public relations director, Oliver Iron & Steel Corp., Pittsburgh, has been named advertising manager of Koolvent Metal Awning Corp. of America, Pittsburgh.

—o—

Dr. Allen G. Gray, Electrochemicals Division, Niagara Falls, N. Y., E. I. du Pont de Nemours & Co. Inc., has been elected national chairman of the

B. D. CLAFFEY

Elected executive vice president and general manager, Acme Aluminum Alloys Inc., Dayton, O. Noted in STEEL, Oct. 27 issue, p. 68

LEE S. COULTER

Promoted to manager, Industrial Sales Division, American Hoist & Derrick Co., St. Paul. Noted in STEEL, Nov. 10 issue, p. 96

RICHARD S. HUXTABLE

Appointed executive vice president and general manager, Fawick Airflex Co. Inc., Cleveland. Noted in STEEL, Nov. 10 issue, p. 101

electrodeposition department, Electrochemical Society, and a member of the board of that Society. He will be editor-in-chief of Vol. I, "Modern Electroplating" revised, and Vol. II, which are published by the Society.

—o—

Hannifin Corp., Chicago, announces the appointment of **David G. Henderson** as sales engineer for the Hannifin line of hydraulic and pneumatic cylinders, presses, riveters, power units, and control valves in the Pittsburgh area.

—o—

William E. Bryden, sales engineer, Timken Roller Bearing Co., Canton, O., has been transferred from the Chicago office to the Cincinnati office of the Timken Steel & Tube Division. He will be succeeded at Chicago by **William T. Strickland,** sales engineer.

—o—

D. F. Axelson has retired as vice president in charge of manufacturing, Axelson Mfg. Co., Los Angeles. As a result of Mr. Axelson's retirement, **R. N. Pease,** formerly vice president and manager of the company's plant in St. Louis, has been promoted to vice president and assistant general manager, at Los Angeles, and **Victor Mancuso,** formerly works manager, has been promoted to the position of vice president in charge of manufacturing. Mr. Axelson's retirement marks the close of some 40 years' association with the company, founded in 1892 by his father and uncle.

—o—

Robert S. Devlin has been appointed sales representative in the northern part of Minnesota, Wisconsin and Michigan for General Steel Warehouse Co. Inc., Chicago.

—o—

W. G. Miller has been appointed assistant to the works manager, Westinghouse Electric Corp., at the company's Buffalo divisions. **Alexander Martin** has been appointed manager of the central district of the Sturtevant Division of the corporation. He succeeds **Harold C. Hickock,** who has resigned.

—o—

Edward Hanus has been made personnel manager of the Osborn Mfg. Co., Cleveland. He succeeds **George R. Lundberg,** who has been appointed chief accountant of the company. **J. O. Soldner** has been appointed factory accountant.

—o—

Paul L. Arnold has been appointed resident manager of the Chattanooga Works of the U. S. Pipe & Foundry Co., at Chattanooga, Tenn. He joined this company in 1930 at the research department, general offices in Burlington, N. J., and during 1934 to 1945 was assistant engineer in that department. He became superintendent of the company's Shell Division at Addyston, O., in 1945, and a year later was appointed assistant resident manager at Chattanooga works, where he now succeeds **A. J. Fruchtl** in the top capacity at this plant.

—o—

S. H. Egbert has been appointed production manager of McCulloch Motors Corp., Los Angeles. He has been assistant production manager directing procurement.

—o—

Allen I. Shargel recently joined the sales department, Carpenter Steel Co., Reading, Pa.

OBITUARIES

E. M. Allen, 75, retired president and chairman, Mathieson Alkali Works Inc., New York, died at his home in Rye, N. Y., recently. He was a director of the company at the time of his death, and had retired as president in 1944, and resigned as chairman of the board in 1946.

—o—

Alfonso B. Addington, plant superintendent and personnel director, McWane Cast Iron Pipe Co., Birmingham, died Nov. 7 at his home in that city. He was a member of the American Foundrymen's Association.

—o—

Frank Kavanaugh, 65, who retired Sept. 30 as shop superintendent, American Bridge Co., Gary, Ind., died Nov. 9 in that city.

—o—

Thomas J. Sullivan, 54, assistant purchasing agent for the South Wind Division, Stewart-Warner Corp., at Indianapolis, died recently.

—o—

Charles J. Beck, 74, president, Charles Beck Machine Corp., Philadelphia, died Nov. 2 after a long illness.

—o—

Walter E. Sargent, 72, retired treasurer of Cutler-Hammer Inc., Milwaukee, died Nov. 4.

—o—

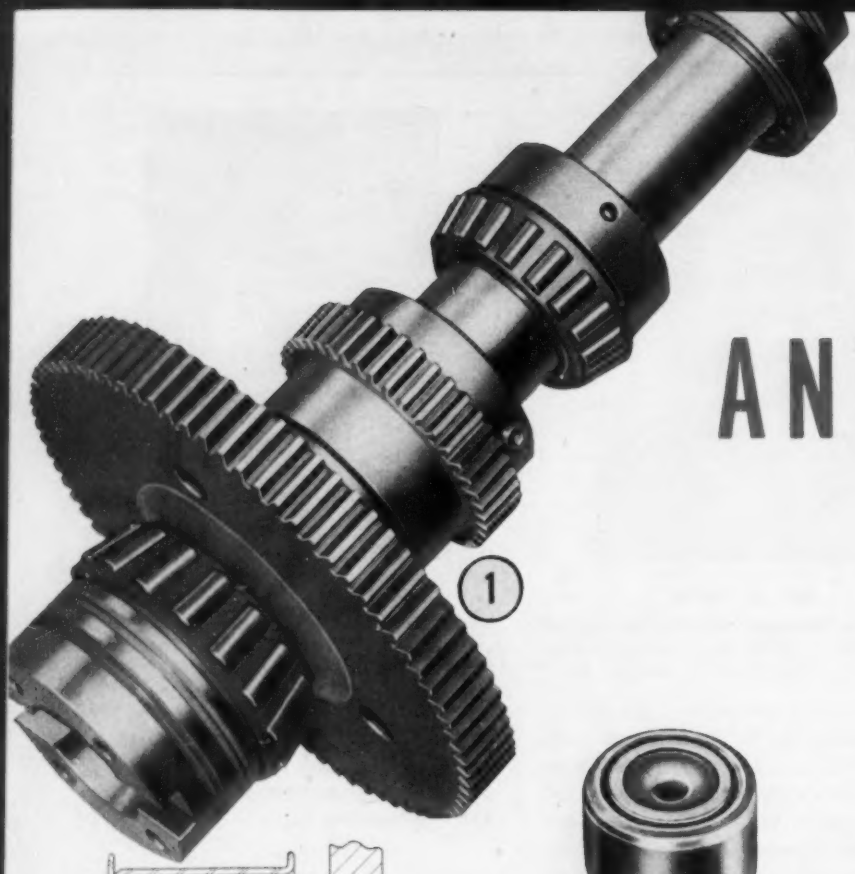
C. G. Hittinger, 75, retired superintendent of the Pennsylvania Pump & Compressor Co., Easton, Pa., died recently.

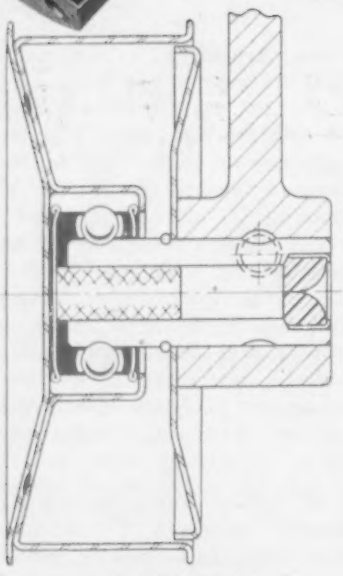
—o—

Gordon S. Nathans, 53, vice president, Chicago Tube & Iron Co., Chicago, died Nov. 5 in that city.

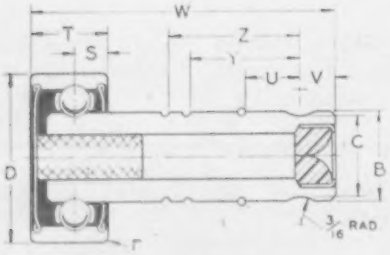
By L. E. BROWNE
Associate Editor, STEEL

ANTIFRICTION BEARINGS

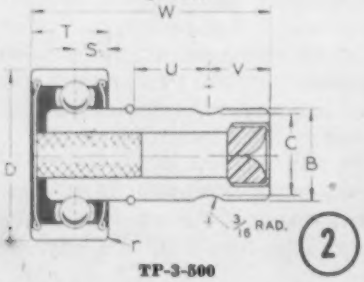




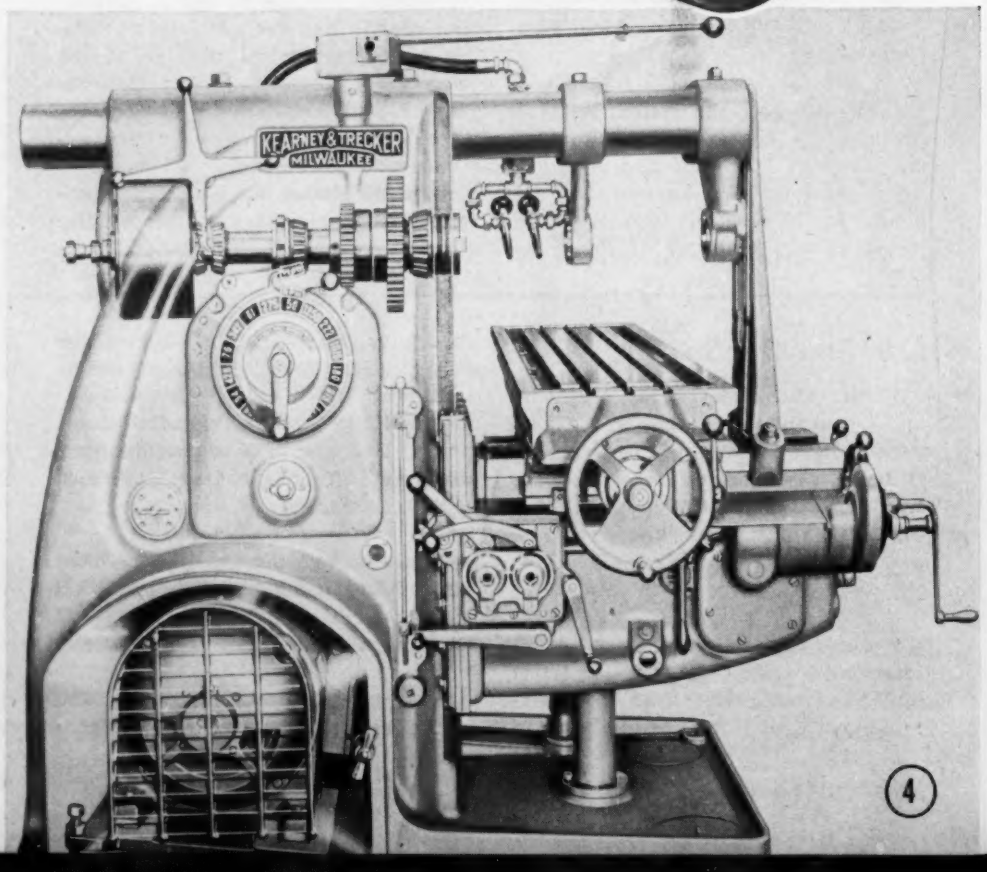
Typical Mounting



TP-15-500 and TP-18-500
(TP-18-500 has no Z dimension groove)



TP-3-500



In this introduction to a series of articles, the author discusses fundamentals of bearing practice, including design considerations, and examines some typical industrial applications

AS INDUSTRY moves into the realm of higher speeds and increased accuracy with lower unit costs the universal goal, application of antifriction bearings, is broadening rapidly. In machines and appliances, both productive and nonproductive equipment, where friction and wear are inevitably involved in the turning of shafts and wheels, the rolling bearing is being designed and engineered into power-driven machinery and equipment, successfully overcoming production problems at increased rates once thought impossible.

Contributing to this progress are all types of antifriction bearings, ball, straight roller, tapered roller and needle, sometimes in combination, according to design and utility.

Developments in the application of antifriction bearings have been marked since the war. Bearings have wide acceptance in plastic mills, vinylite being among the most recent. For increased speed, lower friction and longer life, the rolling bearing is being applied more for sugar mill operation.

Ferrous and nonferrous rolling mill equipment is nearly completely antifrictionized. On rolling mill and other heavy equipment, great savings with longer durability are possible by use of antifriction bearings.

Antifrictionization of freight car equipment is proceeding rapidly and in this field of transportation indications are that use of the roller bearing will be general, once freight cars now being constructed with bearings are put into service. On order or in service are more than 2000 cars for freight hauling equipped with antifriction bearings. Almost as many cars, about 2000, are in service or on order for steel companies, iron mines, limestone quarries and other heavy transportation. Iron mines, for example, can greatly increase capacity of cars by application of roller bearings.

Use of bearings on agricultural implements other than tractors is mounting. Tractors have generally been antifrictionized for some years, but now farm wagons, hay balers, grain drills, corn and cotton pickers, plows, disk harrows and many other miscellaneous farm tools are bearing equipped.

Among production prod- (*Please turn to Page* 126)

Fig. 1—*Kearney & Trecker three-bearing spindle design, unit assembly apart from machine*

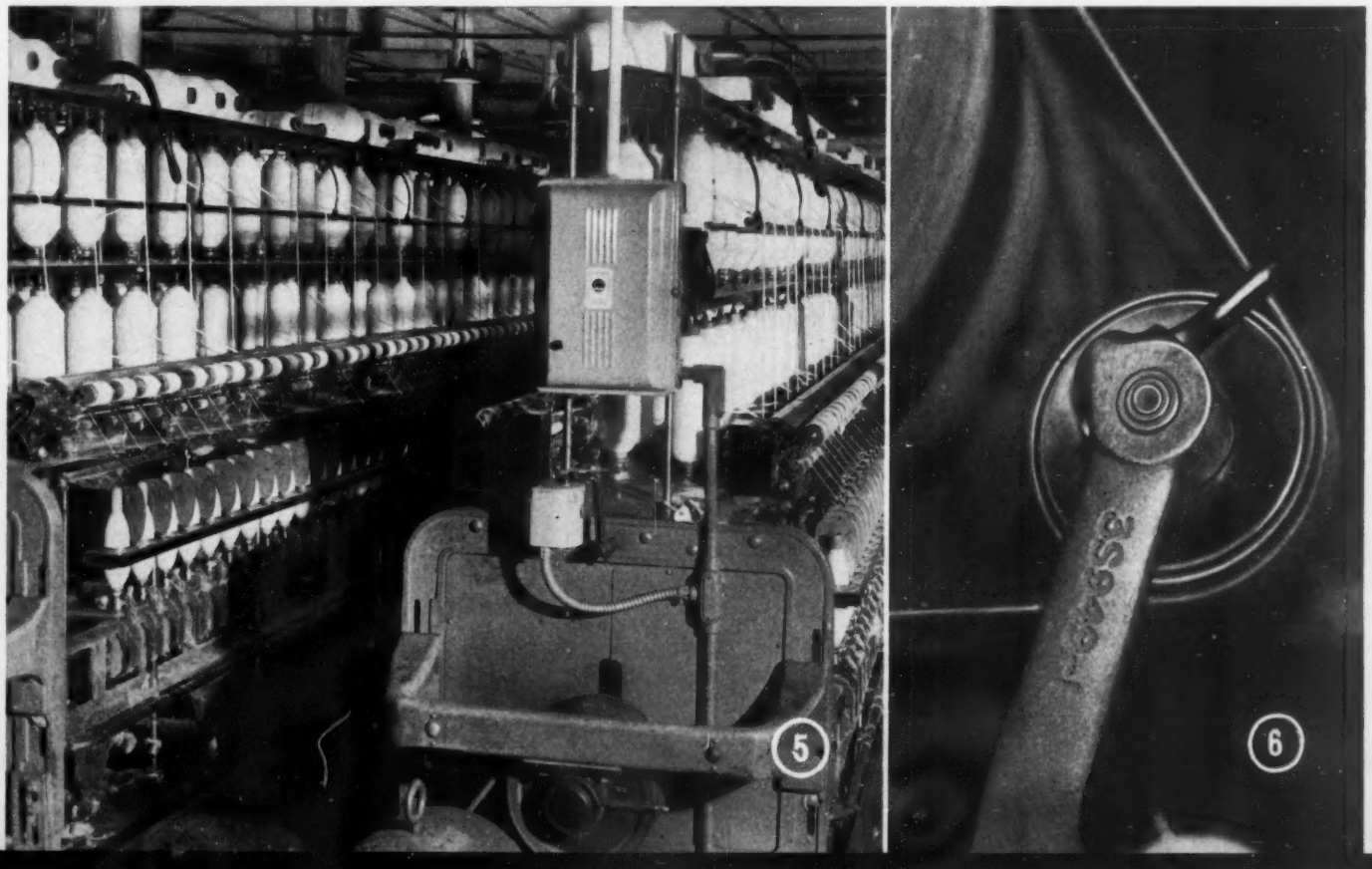
Fig. 2—*Typical mounting and design details of New Departure ball bearing series used in textile industry*

Fig. 3—*End views of horizontal tape tension New Departure pulley bearings, TP-3-500; these are widely used in textile machinery*

Fig. 4—*Three-bearing spindle assembled in a plain milling machine with bearings mounted in position; flywheel is mounted on spindle*

Fig. 5—*Tension pulley mounting in Saco-Lowell spinning frame in plant of International Braid Co.*

Fig. 6—*Streamlined design of tension pulley mounting is illustrated here*



Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

MECHANICAL HANDLING: If you as a manufacturer of metal products haven't yet awakened to what "the handwriting on the wall" tells about materials handling in relation to machining, you should be following me around on my "Fall Circuit" of the major conventions of the metalworking industies.

I found the gear people deeply concerned about this phase of mechanization at the AGMA meeting in Chicago—even though they had no formal paper on the subject. I found the American Society of Tool Engineers devoting an entire session to it at the semiannual meeting in Boston. I found the members of the National Tool and Die Manufacturers Association talking it over in the corridors of the Benjamin Franklin Hotel in Philadelphia—in the neighborhood of which city the famous millwright Oliver Evans laid the foundations for mechanical materials handling way back in 1785. As you read this, I am finding the members of the National Machine Tool Builders Association cognitating on ways and means of conveyorizing their equipment, as they gather in groups during the annual meeting at Hot Springs, Va.

Thomas N. Parlon, associate director of field activities, Yale & Towne Mfg. Co., Philadelphia, hit the nail on the head as far as the machine tool situation is concerned, in the following which I quote from his paper at the ASTE materials handling session in Boston.

"It took a war really to teach American industry the true meaning of material handling:—That *how* materials are moved is a vital item in the cost of the finished product; that the average man can do only about as much work as an eighth-horsepower motor; that muscle power can't keep pace with modern production machines; that the same type of thinking that the cost accountant applies to a processing operation should be applied to the movement and storage of parts and components between processing stations; that you quickly come to the "botton of the barrel" in shaving production costs by refining machine tool metal cutting operations, but have plenty to shave from your materials handling cost.

"When a skilled machine tool operator stands idle at $2.00 per hour waiting for parts to be carried or dragged to his machine by muscle power, you don't have to be an expert accountant to figure that the cost of the finished product is skyrocketing. And with the abrupt rise in the 'break-even point' with which almost every business is being faced today, materials handling is a major determinant of profit or loss."

American machine tool builders demonstrated at their great Machine Tool Show in Chicago in September that they realize this, that they have done something about it, and that they rapidly are becoming fully as worthy to be called the 20th Century descendants of Oliver Evans, father of materials handling, as they are to be recognized as descendants of Eli Whitney, father of the Interchangeable System of Manufacturing.

The techniques launched by Evans the millwright in 1785 and by Whitney the gunsmith in 1798, are merged and are of equal importance in the latest production machine tools. Ingenuity displayed in mechanically getting the work in and getting it out of these machines—and in removing the chips—rivals that involved in the actual machining operations.

SILENT GEARING: Modern gear manufacturers grind their own teeth when they hear or read thoughtless references to "clash of gears", "growling of pinions", "rumbling of cog wheels" and similar remarks or written statements stemming out of the folk lore of 18th Century mill gearing, 19th Century ice cream freezers and early 20th Century "horseless carriages".

That gearing worthy of the name no longer is "that way", was one of the facts impressed upon us during the recent semiannual meeting of the American Gear Manufacturers Association in Chicago. Otherwise our 1947 way of life simply wouldn't exist—so completely is it "geared up".

As a matter of fact noises which are blamed on faulty gear teeth are in large measure unjustly blamed. That was one of the points brought out at the Chicago meeting of AGMA by L. J. Collins, research engineer, General Electric Co., Lynn, Mass., in his paper on "Application, Design and Making of Gears".

Mr. Collins said: "It is safe to state that there is no one item concerning gears that has received more comment than *noise*. One explanation of why this is so may be as follows:

"Power is transmitted from pinion to gear or from gear to pinion through tooth contacts. Since the teeth are machined in solid material, noise generally is believed to be caused by impact of one tooth upon another.

"Noise reading and sound analyses have been made on supposedly 'objectionable gears' whose tooth mesh frequency actually was so low as to be undetectable. In such instances, the noise blamed on gear teeth has been found to be caused by one or more of the following conditions:

"Misalignment of rotating parts; eccentricity of pinion or gear; unbalance of rotating parts; resonance of one or more parts of gear case or rotor; 'beat notes' between various components; critical speed vibrations; oil whip; and trapping of oil in tooth spaces."

The adage "Silence is Golden" certainly is one which applies even with more force to modern mechanisms than it does to people. So it is that gear engineers and gear manufacturers have devoted so much effort and time and money to "gear silence".

By O. H. DOLL and A. L. JENNY
Works Laboratory
General Electric Co., Pittsfield, Mass.

Training

Quality Control Personnel

FOR ELECTROPLATING OPERATIONS

Maintenance of quality through control of materials and processes is dependent upon skilled personnel. One company's training program is described here

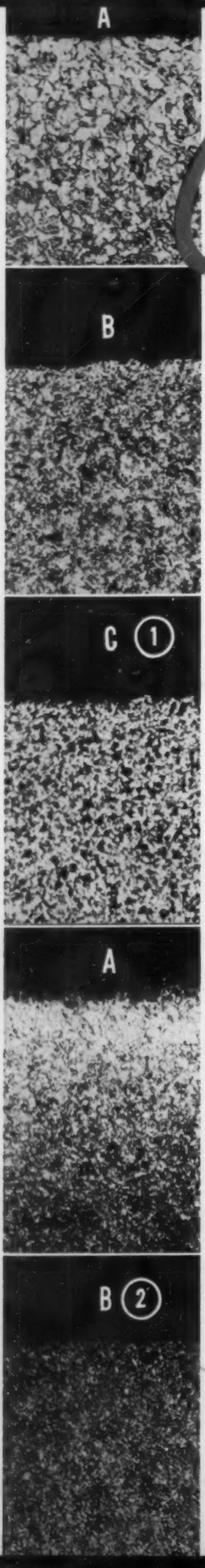
IN the electroplating industry an ever increasing amount of thought and attention is being given to the quality control of electrodeposited finishes. Individual physical properties of electrodeposits which collectively form the basis for judging quality may be enumerated as follows: General appearance, adhesion to the base metal, porosity, uniformity of distribution, and thickness.

Since the responsibility for proper usage of cleaning and plating baths and facilities, according to accepted plant practice, rests largely with the individual plater, the conscientious application of his knowledge and skill are of vital importance in producing electrodeposits having good appearance, adhesion to the base metal, and uniformity of distribution. All three depend to a considerable extent on adequate cleaning prior to plating, and attention to such plating conditions as bath temperature, current density and voltage, all of which are under the direct control of the operator. The properties of porosity and thickness which also help to identify quality plating are somewhat outside the scope of the average plater and are not directly and completely under his control by virtue of the inherent nature of the deposit.

Porosity and thickness, however, are closely linked to the extent that the number of pores usually varies inversely as the thickness of the deposited metal, so that a single control is adequate for both. Thus, a rather brief analysis of the factors affecting the quality of electrodeposits reveals that the production of high-quality plated finishes may be achieved and maintained by controlling plate thickness and plating bath composition, combined with a conscientious utilization of facilities on the part of the plater himself. On such a foundation an adequate and efficient quality control department can readily be built.

In order to be adequate, a department dedicated to the maintenance of quality through control of materials and processes must necessarily be manned by trained personnel (*Please turn to Page* 114)

Operator lowering material into electroplating bath after thickness check by control operator



ADVANTAGES AND APPLICATIONS OF Carbon Restoration

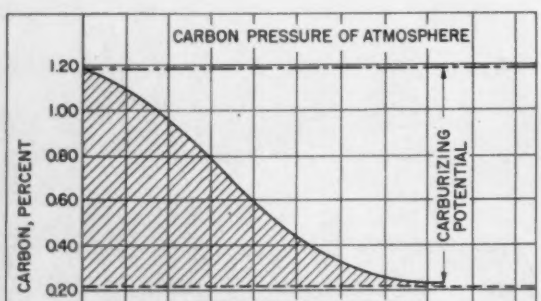
Surface carburization in carbon and low alloy steels has always been a source of trouble for machine designers and metal processors. By setting up an exact carbon balance between furnace atmosphere and original carbon in the steel, a gaseous process seeks to remove undesirable inverse gradient of carbon. Treatment may be applied at almost any stage in program of converting original billet into a finished product

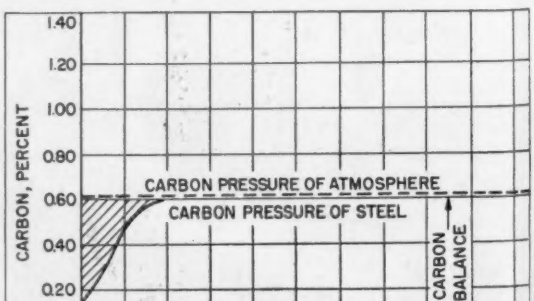
WHY is it necessary to specify medium or high carbon steel rods and bars ⅛-inch or more oversize when the extra metal must be removed by costly machining and ultimately returned to the steel mill at very low scrap prices? Again, why are machine dies and many other fine tools subjected to such extensive machining and grinding after hardening when it would be so much easier to complete all or nearly all of these operations on the metal in its soft condition before hardening?

To the uninitiated, these and many similar questions are the normal reaction to observed practices. To those skilled in the metalworking arts, the answer has long been thought to be perfectly obvious—the decarburized surfaces must be physically removed.

Surface decarburization of carbon steels and low alloy steels has always been a source of trouble and worry for the steel manufacturer, and in a far greater degree, for the machine designer and the metal processor. It is a matter of great concern when a steel part designed for a specific application and considered perfect from the standpoint of chemical analysis, of design and of physical structure, fails due to the presence of a few thousandths of an inch of surface decarburization.

One serious result, the notch effect, of surface decarburization has been made the subject of extensive study. It is generally agreed that the heat treatment of steel parts results in the setting up of tension stresses in the outer decarburized portions as opposed to compression stresses set up in the main body of the steel. Consequently, when the part is repeatedly work-stressed by loading far below the theoretical design value, the surface layers may fail. Thus, the stage is set for early failure of the entire cross-section. (*Please turn to Page* 121)





By O. E. CULLEN
Chief Metallurgist
Surface Combustion Corp.
Toledo, O.

Fig. 1 — Photomicrographs of Amola steel MS 267; A—material as received; B—after carbon restoration; C—after grinding off decarburized areas and applying carbon restoration. All photomicrographs 100X

Fig. 2—A—Surface condition of forged part after normal heat treating; B—forging after carbon restoration treatment

Fig. 3 — Typical carburizing curve showing unbalanced carbon concentration from surface to core metal

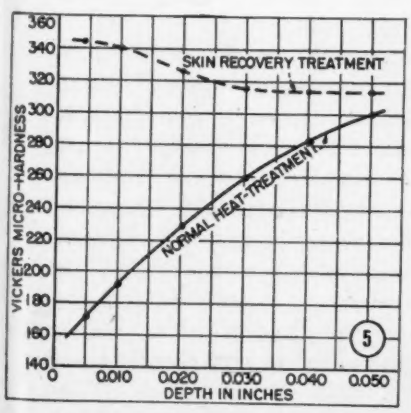
Fig. 4—Typical carbon restoration curve showing balanced carbon concentration from surface to core metal

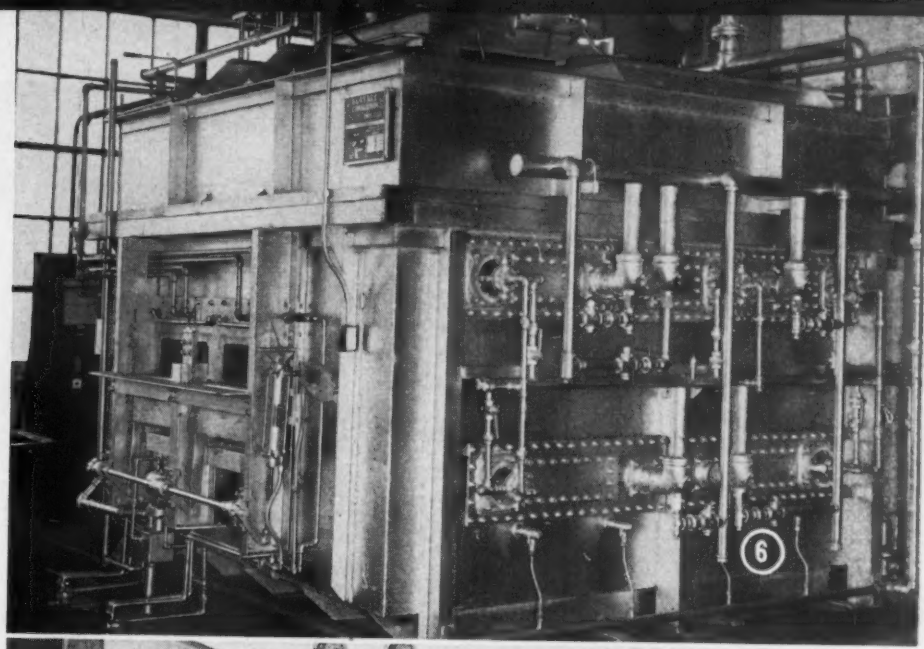
Fig. 5—Vickers microhardness versus depth reading on SAE 4140 steel forgings hardened with and without carbon restoration

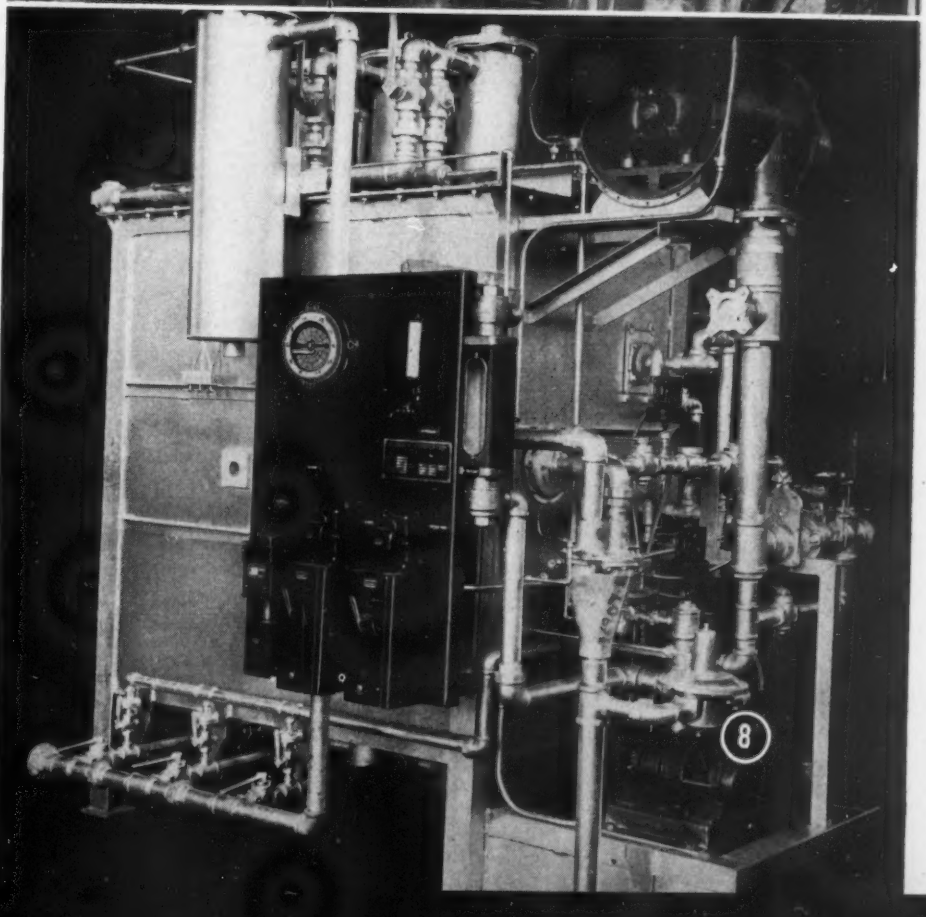
Fig. 6—Radiant tube fired rotary hearth furnace used in carbon restoration of bolts

Fig. 7—Group of forged aircraft propeller hubs being removed from furnace after carbon restoration. RX gas is used in this process

Fig. 8 — RX prepared atmosphere generator







Good Vision PROGRAM

Increases Efficiency, Improves Employee Morale

STEEL industry has a special interest in applying the best available knowledge of vision care. From the standpoint of eye injuries, the most hazardous industries are steel and other metalworking. About one-third of the accidents in the average plant result in eye injuries, and three out of five industrial eye accidents occur among metalworkers.

A good vision program, however, will not only reduce accidents, but it will also increase efficiency and improve employee morale. The company applying principles that have proved successful can take an important step toward greater productivity and a better competitive position. One steel company reduced its accident rate by 27 per cent during the war, and production was increased 50 per cent while new, inexperienced employees were being added. This improvement was credited to a systematic vision program.

War Production Board found that productivity was increased by 15 to 25 per cent in many plants where employees were given scientific vision care. Increased productivity benefits both management and employees.

One of the greatest immediate needs is better visual examination to determine the visual capacities of employees. Many companies make no visual tests of either old or new employees, and most of those who do, use obsolete methods. The standard Snellen test in which letters on a chart are read at a distance of 20 feet reveals little about one's capacity to handle a specific job, yet it is the only test in most industrial companies.

A comprehensive vision program requires job analysis to determine the visual requirements for each job, and then thorough examination of employees so that jobs and employees can be matched. Consider, for example, the differences in visual requirements for the crane operator and the die maker. For the crane operator distant vision—20 feet or more—is most important. The work point for die maker is 12 to 20 inches. Near-point vision is most neglected in modern industry.

Color discrimination may seem unimportant in a steel plant, but one company found differently after a serious mistake. Steel rods of different carbon content were designated by colors painted on the ends. A stockroom employee who was color blind sent out a shipment of wrong specification, and the error was not discovered until the shipment arrived at its destination 500 miles away.

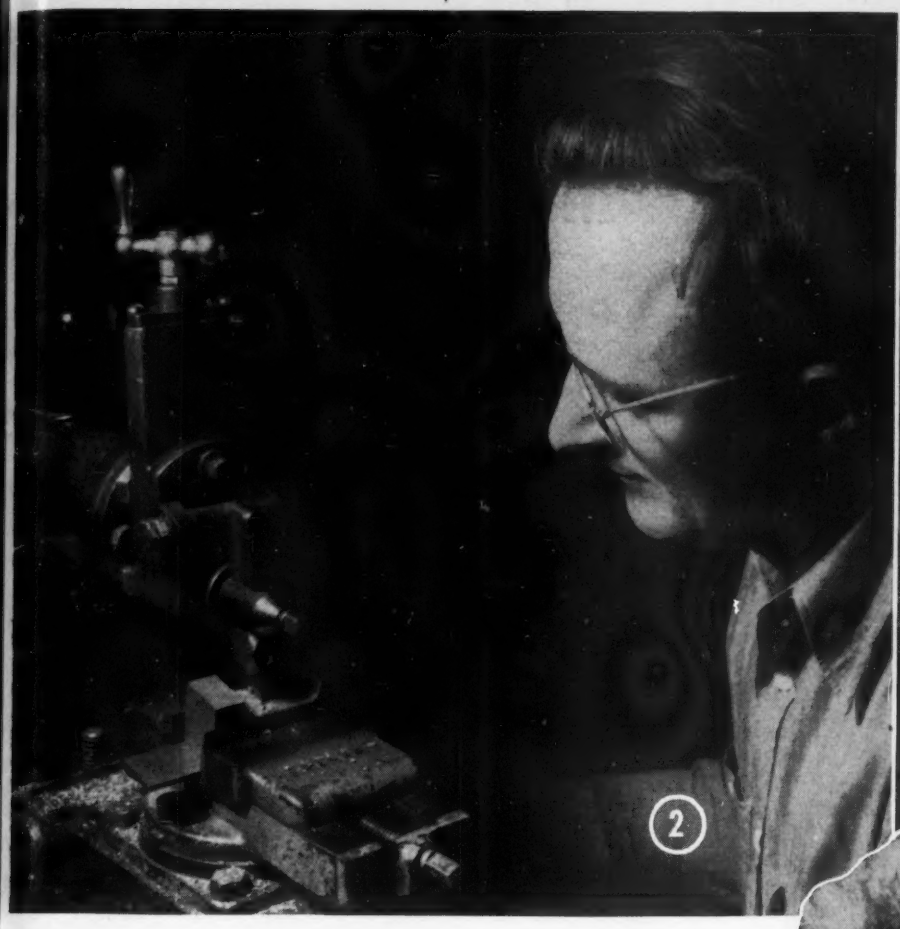
In another plant two employees were injured on successive days by a crane. The operator was given a visual examination, and it was found that he had an abnormally narrow field of vision. He could see straight ahead but not to the sides without turning his head, and he did not detect the workmen who were in the way of his swinging crane. Adequate field of vision is especially important to crane operators and truck drivers.

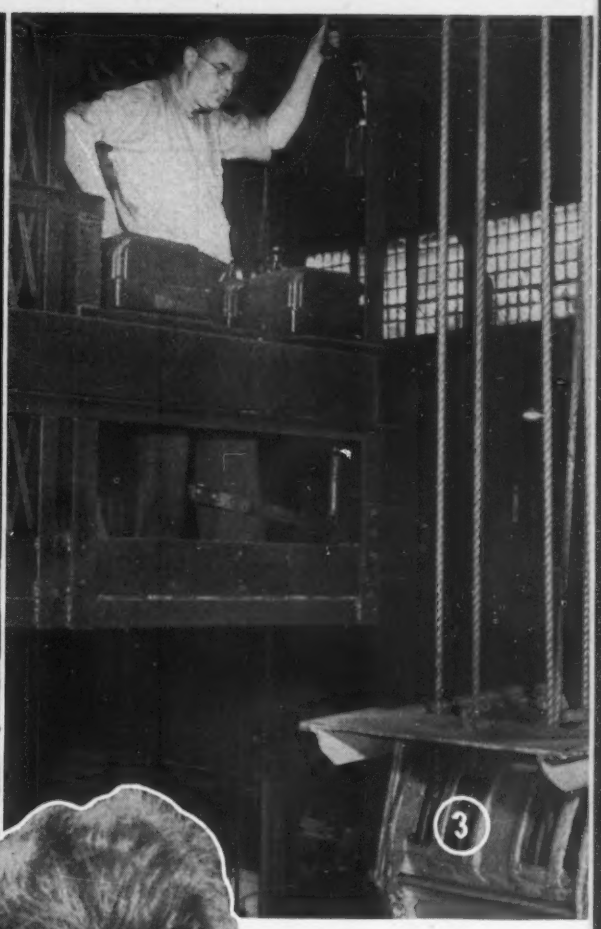
Many employees lack proper depth perception, ability to judge relative distances. Instead of seeing three sides of a box clearly they tend to see just a flat surface. Such an employee would need visual correction before he could be an accurate die setter, for example.

Few employees suffer visual handicaps that cannot be corrected. The purpose of a visual program is not to weed out employees, but to detect those who need visual care, bring them up to their full capacities, and fit them to jobs in which they can be visually efficient.

Practical Program: Assuming that a company recognizes the importance of better vision, how can it institute a practical program? In most companies the approach is by way of a safety program. Management becomes convinced that all employees in hazardous jobs should be required to wear safety goggles. It usually finds that about half the employees are already wearing glasses, and that, therefore, carrective as well as safety lenses must be provided. The question then arises as to how many need visual correction and whether those wearing glasses have lenses properly suited to their jobs.

A company which approaches a safety goggle program systematically soon arrives at the conclusion that the job will only be half done unless provision is made for visual examination and correction. This requires the services of a vision specialist. The optometrist is such a specialist. He makes a complete visual analysis, prescribes and adapts proper lenses, or administers visual training where necessary. He is trained to detect and recognize disease in the eye, and where present, he refers the patient for other professional care. Ophthalmologists and occulists are physicians specializing in pathology and surgery of the eyes. Professional (*Please turn to Page* 124)





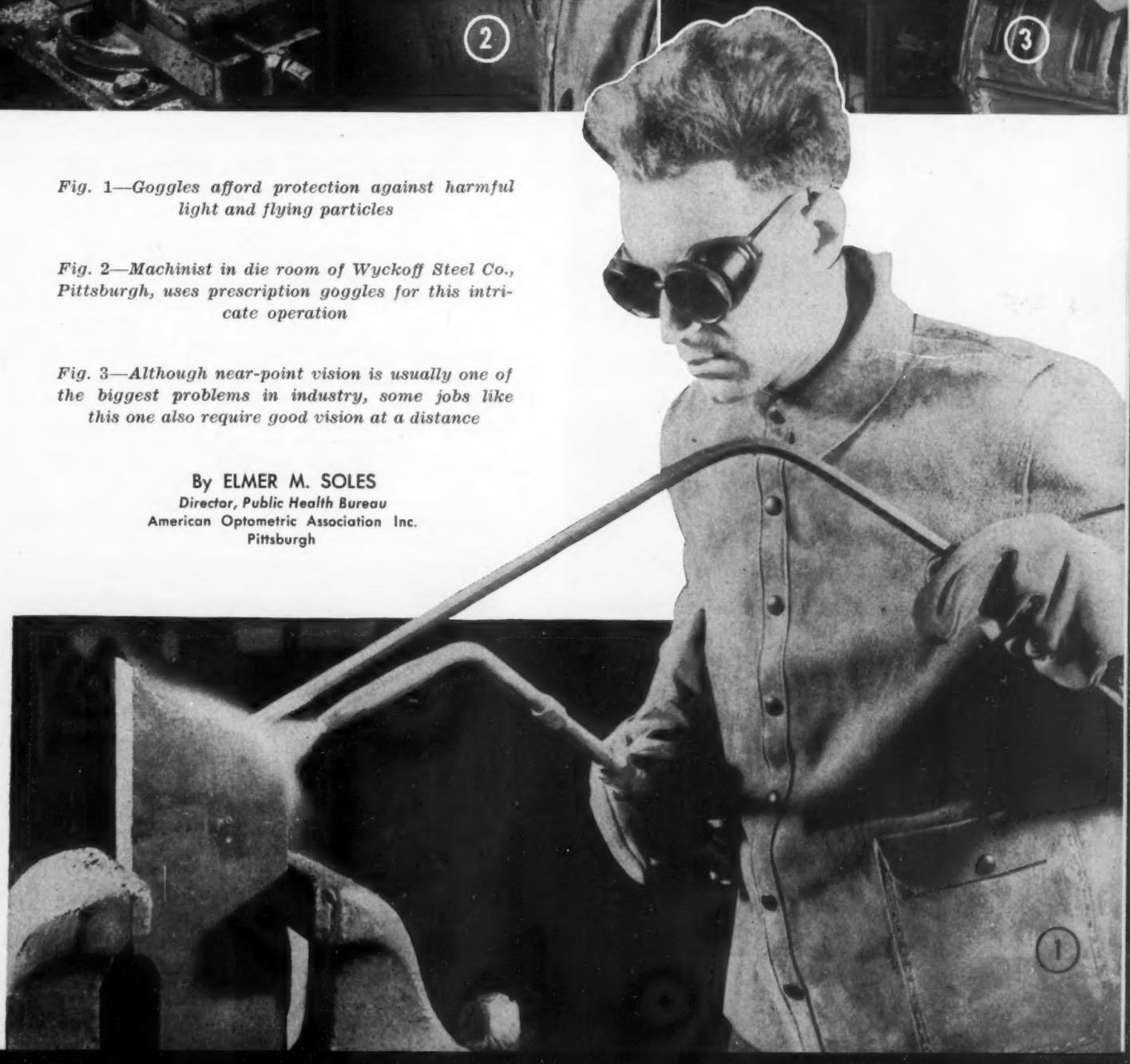


Fig. 1—Goggles afford protection against harmful light and flying particles

Fig. 2—Machinist in die room of Wyckoff Steel Co., Pittsburgh, uses prescription goggles for this intricate operation

Fig. 3—Although near-point vision is usually one of the biggest problems in industry, some jobs like this one also require good vision at a distance

By ELMER M. SOLES
Director, Public Health Bureau
American Optometric Association Inc.
Pittsburgh

METALLURGY

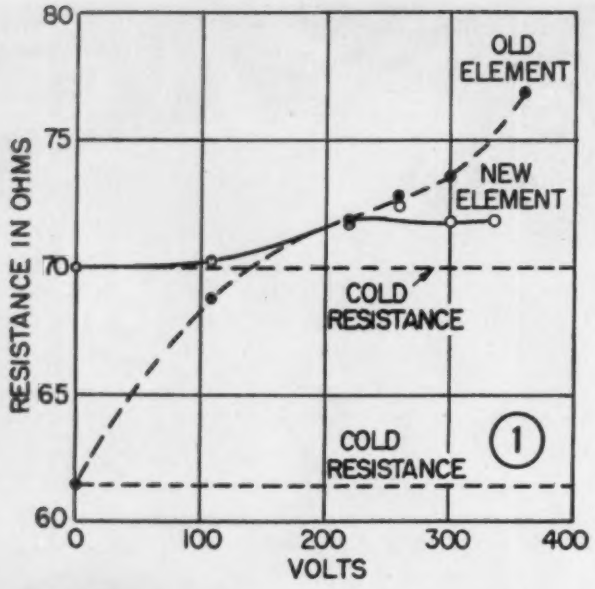


Fig. 1—Comparison of resistance of new and old 80-nickel 20-chromium alloy elements with increasing voltage or temperature

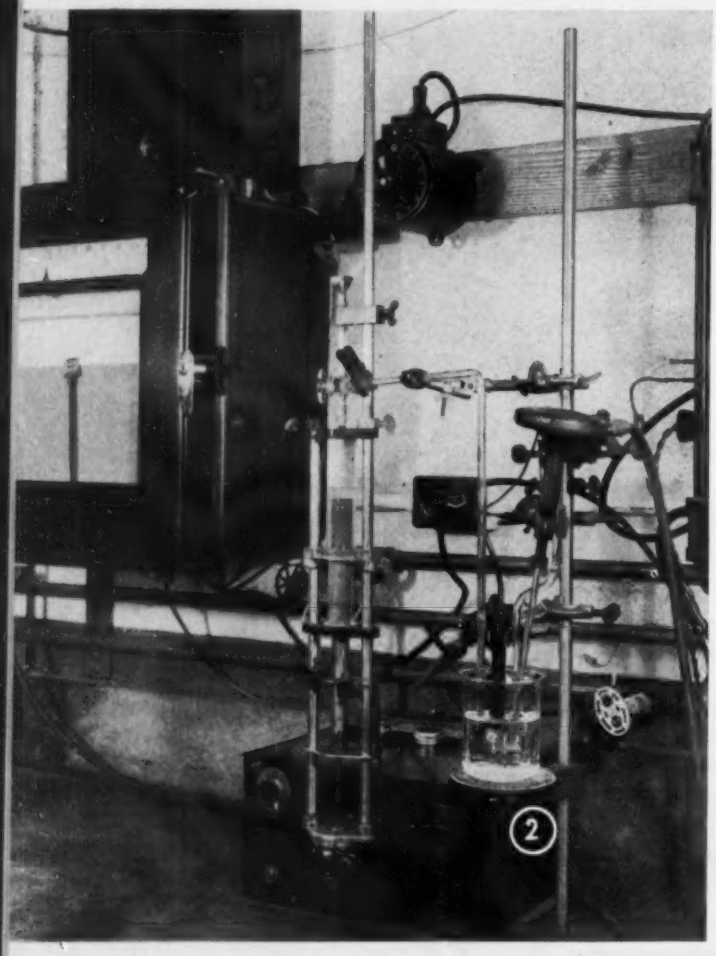


Fig. 2—Apparatus for automatic potentiometric titrations developed in laboratories of Dow Chemical Co.

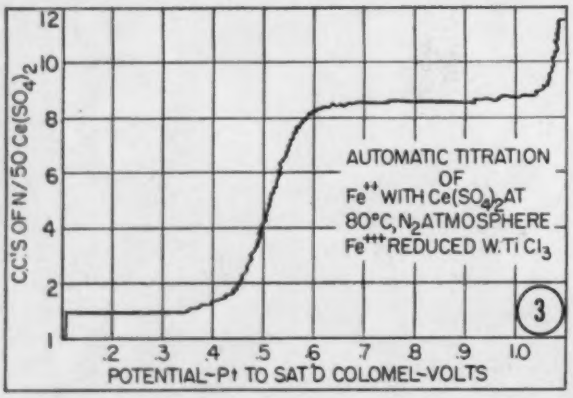
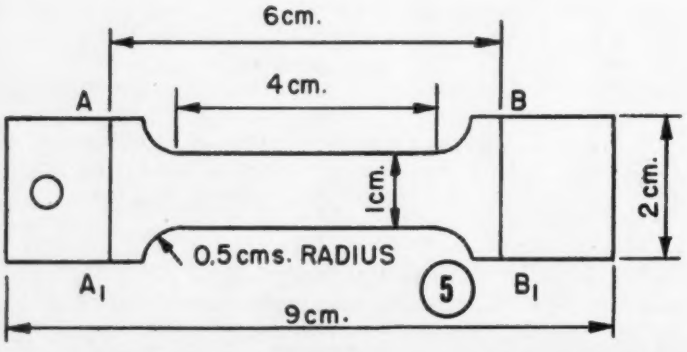


Fig. 3—Curve for automatic titration of iron in automatic potentiometric apparatus

Fig. 4—Surface of hard chromium plate showing crack system. Various steps in the formation and covering over of cracks are illustrated. Decomposition of hydrides, formed in the plate, into hydrogen and chromium, is accompanied by considerable shrinkage in volume, with resulting cracking of the plate. Unetched surface X350. Courtesy Battelle Memorial Institute

Fig. 5—Test specimen used in determining ductility of industrial chromium deposits



and AUTOMATIC CONTROL

...revealed at Boston meeting of Electrochemical Society

NEW developments in corrosion, metallurgy, plating, and automatic methods of analytical control featured the 92nd meeting of the Electrochemical Society at Boston's Copley-Plaza Hotel, Oct. 15-18.

Scientific sessions were also featured on new primary cells, storage batteries, the Per compounds, and electro-organic synthesis. One feature of interest to many members attending the meeting was a demonstration of a new process for electropolishing silver at the research laboratories of Arthur D. Little Inc., Cambridge, Mass.

One of the opening papers at the scientific-technical session on high temperature products, presided over by James H. Critchett, was a discussion of the mechanism of failure of 800 nickel-20 chromium alloys at excessive temperatures, by H. D. Holler, Bureau of Standards, Washington, D. C. This paper was based on investigations carried out in Westinghouse Research Laboratories. It was reported that in making life tests on electric heaters of the swaged type, the electrical resistance of 80 nickel-20 chromium alloy wire heating elements, measured cold during accelerated life tests, decreased; this decrease was accomplished by a loss of chromium in the alloy. However, there was little change noted in electrical resistance, measured hot, which is attributed to the marked increase in temperature coefficient of resistance which occurs with loss of chromium. Fig. 1 illustrates a comparison of resistance of new and old alloy heating elements with increasing voltage or temperature. Thus it is suggested that the measurement of the cold resistance of a heating element on life test serves to indicate whether the wire temperature is excessive.

These observations indicated a probable change in the composition of the wire and subsequent chemical analysis showed loss of chromium. For example, it was brought out that a heating element having an initial resistance (cold) of 78 ohms and 18.4 per cent chromium had, at the end of the life test, a resistance (cold) of 62 ohms and 8.5 per cent chomium. The wire became 91.5 per cent nickel and also was covered with a green coating of chromic oxide, determined by qualitative analysis. The chromium had apparently diffused to the surface of the wire and become oxidized, the supply of oxygen being sufficient for at least partial oxidation.

Holler pointed out that the loss of chromium was probably due to its relatively high vapor pressure as compared with nickel. This is indicated by the boiling points of chromium and nickel, 2200°C and 2900° C, respectively. Diffusion of chromium to the surface of the wire would account for continuation of its loss. Although there are fundamental properties of chromium dependent on temperature and concentration gradients, the possibility of prolonging the useful life of the 80/20 alloy, for example, by coatings such as produced by electroplating, suggests itself. It was suggested that the mechanism of failure of resistance alloys, as heating elements, should be further investigated for the purpose of possible improvement of their life at excessive temperatures.

Improved methods in the various operations involved in the production of ductile zirconium from zircon sands were made as a result of research conducted at the Northwest Electrodevelopment Laboratory of the Bureau of Mines, Albany, Oreg. Highlights of these recent developments, as described were based on an improved method for the production of zirconium carbide from zircon sand by the use of an arc furnace and the melting of zirconium metal in graphite crucibles. The slight carbon contamination does not appreciably impair the working properties of the metal. Thus, the possibility of melting zirconium metal in graphite crucibles and use of the resistor furnace instead of more expensive equipment for heating means that ingots can be made at lower cost.

It was reported that heavy sections of zirconium are usually rolled hot, although hot rolling has several disadvantages. The ingot, if heated to 700° C in the air, becomes coated with an oxide layer which is yellow to brown on the outside and black at the contact with the metal. The yellow color is probably caused by iron. The outer layer is soft and is readily removed with abrasives, but the black inner layer is very hard and neither acids nor ordinary abrasives remove it easily. A silicon carbide grinding wheel cleans the surface slowly.

According to the investigators it was obvious that thin sections could not be cleaned in this fashion; they must be rolled cold with intermediate annealings in pure helium or in a good vacuum. Cold rolling is only practical for soft metal. Ingots should be hot worked in order to break up the cast structure, after which cold rolling can take place. The oxide skin which is always present diffuses into the metal during annealing and a small amount of oxygen can be found in metal that has been treated in this way.

It was reported, however, that it is very easy to roll zirconium and titanium, as well, out of contact

with air by enclosing it in a metal sheath, a practice which has been successfully applied to certain other metals, such as beryllium. A cylindrical zirconium ingot is inserted into a length of pipe or a cavity made by drilling a steel rod, or a flat zirconium cake is placed in a box shaped iron container. The iron or steel casing is then welded to exclude air and the whole assembly rolled hot or cold. If the seal is perfect, no oxygen penetrates to the metal. Thus sections can be cold rolled with intermediate annealing. Soft ingots can be reduced 50 per cent before reheating. If the sheath cracks at the edge, as it sometimes does, the zirconium may be taken out and rewrapped.

Sections as thin as 0.01-inch can readily be obtained, and, since no oxygen reaches the metal, the original composition of the ingot material is maintained. After rolling, the sheets are taken out of their sheaths by cutting the edges of their envelopes with shears. They may be cold rolled afterwards to give them a polished surface. One example given, was that a sheet 0.01-inch thick produced from an ingot having a brinell hardness of 180 can be bent sharply at an angle of 180 degrees without cracking.

Zirconium sheathed in iron should not be rolled at temperatures higher than about 950°C. An example was cited where a zirconium sheet which was sheathed in iron and rolled at 1025° C suddenly ignited and burned vigorously. Also, care should be taken in rolling zirconium sheathed in iron because the excess heat developed in the deforming process may result in some cases in burning, if the process is not properly controlled.

This tendency of the iron and zirconium to unite can be used to plate iron on zirconium by carefully rolling a zirconium ingot encased in iron at temperatures between 800° C and 1000° C with heavy reductions that cause local welding. The iron on one side of the sheet can be removed by dissolving it in acid, or if the rolling is stopped while the ingot is still fairly thick, the ingot can be cut in the middle through the zirconium, and the two halves may be rolled separately after they are rewrapped in iron.

Oxygen is known to harden zirconium to a considerable extent but accurate data as to the hardness as a function of the oxygen content are not yet available. Ingots of pure zirconium have a hardness below 135 brinell; ingots containing 0.1 per cent oxygen were reported to have a hardness of about 190 to 200 brinell, those with 0.2 per cent oxygen—about 250, ingots with 0.3 per cent about 300 on the brinell hardness scale.

Thus oxygen may be considered as a suitable hardening agent for many applications. For example, it was pointed out that springs made of zirconium alloyed with oxygen show good elasticity. Soft zirconium would be entirely unsuitable for this purpose, even though it was cold rolled. On the other hand, oxygen embrittles zirconium and it is questionable whether tools made from oxide-hardened zirconium would keep a cutting edge. One interesting possibility is the surface hardening of zirconium by either nitrogen or oxygen.

In another report from the research work being carried out by the Bureau of Mines, the production of fused silica was demonstrated to be practical in two types of electric furnaces, namely, the arc and graphite resistor types. Although the resistor type of unit was reported to produce a less compact ingot than that made by the arc process, it was said to possess some advantages. Most outstanding of these are: Less contamination of the product from roof material and bits of electrode, lower electrode consumption, and lower power requirements.

Silica tubes are used in laboratory furnaces. Silica is manufactured in larger shapes for use as linings for chlorinators and refractories for high-frenquency furnaces. A low cost product is desirable for these uses as well as for the bulk silica needed by the chemical industry for filling towers of various kinds. Fused silica has even been mentioned as a refractory material for use in steel-making furnaces.

Operation of a new electropolishing process for silver developed by Arthur D. Little Inc., under the sponsorship of Oneida, Ltd., Oneida, N. Y., makers of flat and hollow silverware, was demonstrated at the former's research laboratories in Cambridge, Mass, to the members of the Electrochemical Society. This process, which involves passing a current in a direction opposite to that employed for normal plating, is carried out in a final bath, immediately after plating, and while the silverware is still on the plating racks. It can give a complete polish, up to mirror brightness, and was said to simplify greatly finishing operations with silver plate.

Electropolishing, in general, is a relatively new finishing technique in which the article to be polished is immersed in a suitable bath and electric current is passed in the opposite direction to that employed in ordinary electroplating. Developments in

(*Please turn to Page* 108)

Treatise on Galvanizing Now in Second Edition

Hot Dip Galvanizing Practice, by W. H. Spowers, Jr.; second edition; cloth, 200 pages; published by Penton Publishing Co., 1213 W. Third St., Cleveland 13, O., for $6.00

Subject matter in the first edition has been retained though rearranged to conform more nearly to the sequence of operation. Some of the chapters have been abridged and one deleted. The chapter on "Control of Oxidation and Radiation in Galvanizing Kettles" has been completely revised and new data added such as that dealing with "Typical Modern Galvanizing Plant Construction and Procedure". Since the first edition, important and miscellaneous literature on hot galvanizing have accumulated and this has been included in the 35-page bibliography.

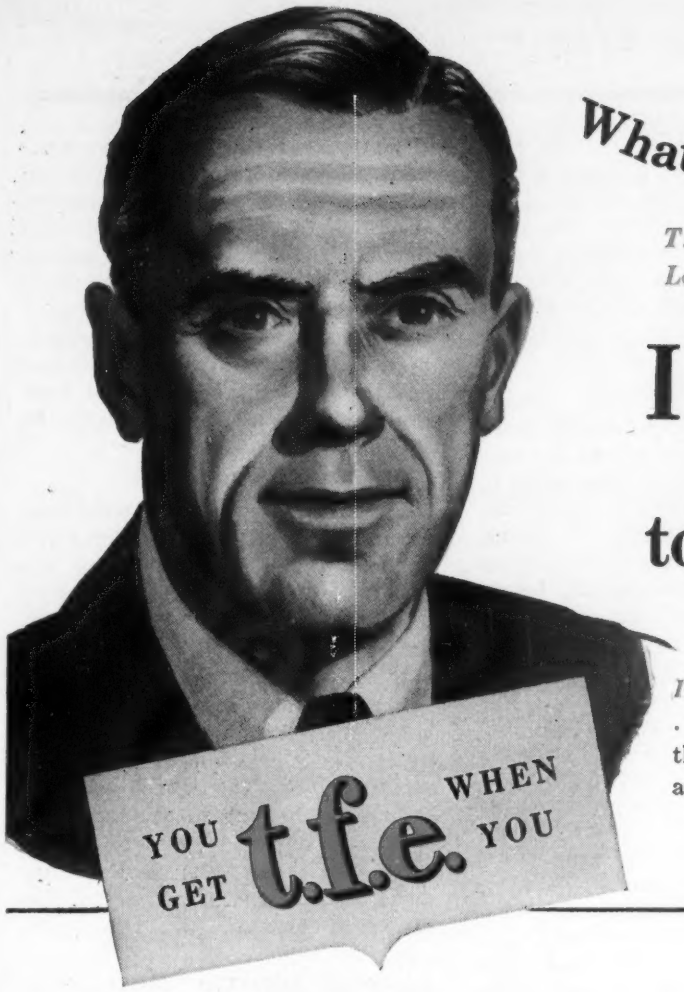
The author discusses the theory of zinc coating and shows how to reduce dross losses to a minimum. Modern galvanizing kettles, including the tube-type heated units, are described and illustrated. Methods of galvanizing various commodities such as wire, poultry netting, hardware cloth, pipe, pipe fittings, sheets, stamped metalware, range boilers and barrels are explained. Other subjects covered include pyrometry in hot galvanizing, control of oxidation, fluxing materials principles and chemical reactions of fluxes and preparation of flux washes.

This treatise is one of the few published on galvanizing practice and should have a place in the library of manufacturing galvanizers, metallurgists, chemists and shop personnel.

Film Made Available on Grinding Carbide Tools

Two new 16 mm sound motion pictures in color are available from Norton Co., Worcester, Mass., for showing to industrial societies, colleges and vocational and apprentice schools. They are titled "Grinding Carbide Tools" and "The Diamond Wheel, Its Care and Use."

The pictures may be used separately or one can be used to supplement the other. Prints are loaned without charge by the company's publicity department, Worcester 6, Mass.



What do Fasteners Really Cost?

There's more to fastener cost than just price. Lots more. Personally . . .

I look for all 8 to get t.f.e.

True Fastener Economy

It is the many costs of using a fastener that count . : . not just the initial price. *True Fastener Economy* is the lowest *total* cost for fastener selection, purchase, assembly and performance.

1. Reduce assembly time to a minimum by savings through use of accurate and uniform fasteners

2. Make your men happier by giving them fasteners that make their work easier

3. Reduce need for thorough plant inspection, due to confidence in supplier's quality control

4. Reduce the number and size of fasteners by proper design

5. Purchase maximum holding power per dollar of initial cost, by specifying correct type and size of fasteners

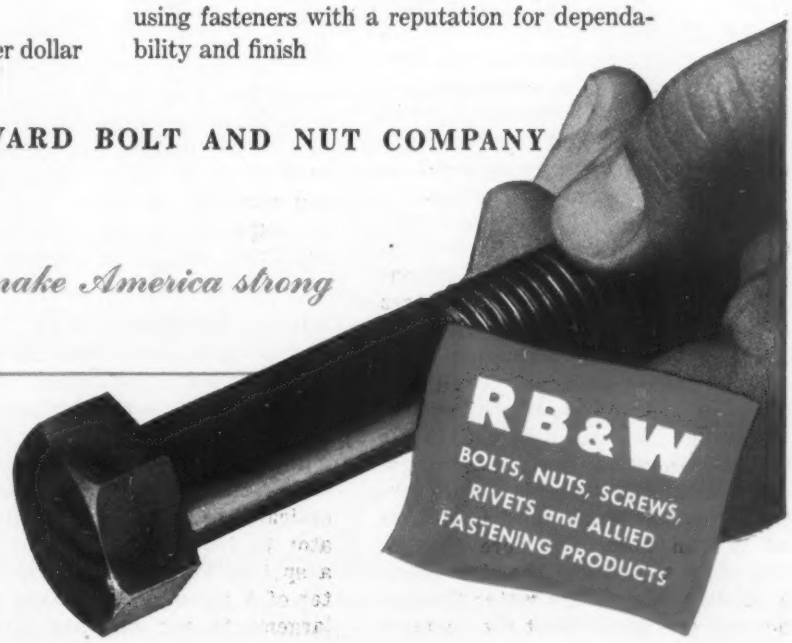
6. Simplify inventories by standardizing on fewer types and sizes of fasteners

7. Save purchasing time by buying larger quantities from one supplier's complete line

8. Contribute to sales value of final product by using fasteners with a reputation for dependability and finish

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

102 years making strong
the things that make America strong



Plants at Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at Philadelphia, Detroit, Chicago, Chattanooga, Portland, Seattle. Distributors from coast to coast. By ordering through your distributor, you can get prompt service for your normal needs from his stocks. *Also*—the industry's most complete, easiest-to-use catalog.

Engineering News *at a Glance*

MOTOR OUTPUT HIGH: In spite of the fact production of fractional horsepower motors is at an all-time high, supply is still short of demands for certain types, it was learned from A. W. Bartling, manager of General Electric's fractional horsepower motor division. Through a standarization program, he stated, the company boosted output of motors for industrial and home applications considerably above average rate for prewar years, yet motors rated from 1/6 to 1/3-horsepower for washing machines, fans, blowers, sump pumps and similar applications are still in short supply. Standardizing enabled the company to reduce the number of different kinds of motors being manufactured at one time from more than 25,000 to less than 4000 to achieve high rate of output.

STEPS UP GALVANIZING: Conveyor system of handling hot water tanks in the recently installed and greatly enlarged West Coast galvanizing plant of Rheem Mfg. Co., is stepping up production considerably. In addition, the new facilities are providing a higher quality product than the older method used previously. According to the Los Angeles company, body and head of the tanks are now processed in one piece through standard operations of hot dip galvanizing practice. Bottoms are coated separately and pressed into the tanks, both zinc coated parts being welded together.

DETECTS OIL BEHAVIOR: By recreating conditions that exist in deep-buried oil sands, Tulsa laboratories of Carter Oil Co., subsidiary of Jersey Standard, now is able to supply answers to such questions as how much oil is there, and how much gas and water are there to drive oil to the surface. Technique used duplicates in hours what nature took millions of years to achieve. Referred to as the restored-state method, it consists of restoring to the pore spaces of a well core—sample of rock specially cut from the formation being drilled—precise amounts of oil and water or gas and water that existed before the core was disturbed. In the process, scientists first clean a new core thoroughly, then place it in contact with salt water until it absorbs all it can hold. The core then is placed in a pressure chamber above a membrane that lets water through but not gas or oil. Next the chamber is filled above and around the core with oil or gas and pressure is applied—a pressure that varies as underground conditons vary. The rest is simple mathematics. Simple measurements reveal how much water is displaced by the oil or gas at any given pressure.

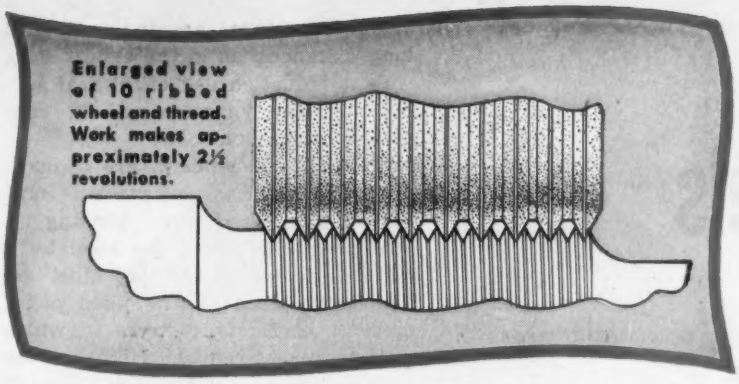
NOT AROUND CORNER: Atomic power plant as a commercially practical unit is not just around the corner, nor around two corners, David E. Lilienthal stated recently before the Economic Club of Detroit. According to the chairman of the United States Atomic Energy Commission, before the first commercial plant is possible, it is first necessary to cut through a jungle of difficult scientific and engineering problems. Even after this "underbrush" is cleared away, and a commercially useful plant of some size is in successful operation, there are other barriers to be overcome before any substantial part of our energy supply—10 to 20 per cent—comes from atomic energy. Clearing of the technical "underbrush" is so complicated, and presents such terrific problems involving chemistry, chemical engineering and metallurgy that it may take 10 or 100 years, depending upon the vigor with which it is pursued, to finally harness atomic power for everyday uses.

SHORTCUTS TRUCK BUILDING: Prefabrication of truck body parts of magnesium ready for assembly has now reached a point where truck operators can now build their own truck bodies without previous experience in working with this metal. The predesigned structural members now offered by Revere Copper & Brass Inc., New York, eliminate usual manufacturing operations on the part of the builder, and require only such processes as clamping, drilling and riveting. In many cases shapes are supplied to exact length so no additional cutting is necessary.

MILLS 3-DIMENSIONAL WORK: In making machine tools for molding and die-sinking industries, one German firm uses a copying miller employing pantograph linkages for milling 3-dimensional work from models. The machine incorporates an optical device that enables the operator to follow his work by keeping a spot of light focussed on the center of a screen. Reductions and enlargements are obtained by simple alterations of slide and pivot positions. Range of tools made on the machine are of very high quality, according to the Office of Technical Services, Washington. In cutting two pairs of templates from steel ⅛-inch thick, for example, the male and female templates fitted together so exactly that when assembled and held to the light only a faint haze could be seen at some parts of the fit.

FAST ACTION: Use of compressed air and two kinds of disks—lined and unlined—enable the brakes on the new heavy graders manufactured by R. G. LeTourneau Inc., Peoria, Ill., to act instantaneously. Lined disks both sides of which are surfaced with bimetallic metal are sandwiched between the unlined disks and fastened by splines to the wheel so that they rotate with it. The unlined disks are splined to the hub so that they are always stationary. Pressure on the faces of these disks causes lined disks to grip those unlined to stop the wheel quickly.

EASY ON ALLOYS: Besides showing excellent metallurgical cleanliness and physical properties comparable to corresponding grades of open hearth and electric furnace steel, "mixed steels" produced by the Germans by mixing open hearth or converter steel with acid electric furnace steel, also minimize loss of alloying elements. In addition, according to an Office of Technical Services report, the process lowers the cost of alloy steel by using cheap materials produced in the blast furnace for alloy additions such as spiegeleisen and ferrochromium. The Washington agency states that in the process a chromium charge is produced in the electric furnace without slagging off to recover all of the charged chromium. This heat consists of a full chromium scrap charge to which cheap ferrochromium produced in the blast furnace is added. The phosphorus content of the electric furnace is disregarded. At the same time a straight carbon heat is made in a basic open hearth furnace. By slagging off frequently, the carbon heat is finished with phosphorus under 0.01 per cent and sulphur under 0.02 per cent. Then both electric and open hearth heats are mixed in ratios that give a product of the required final analysis.



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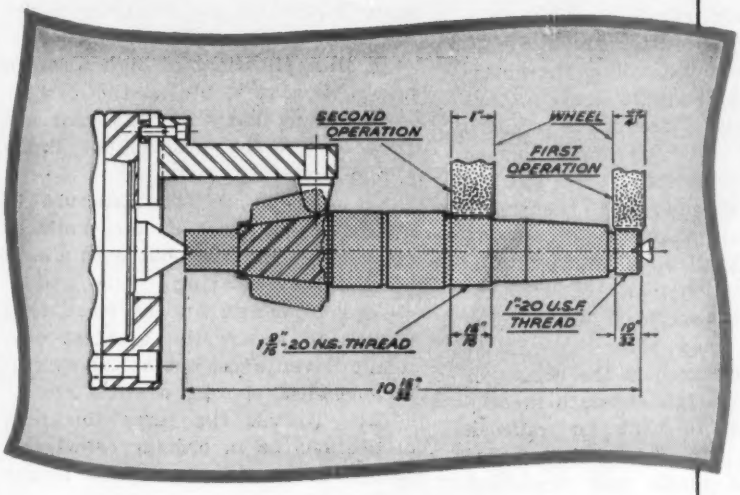
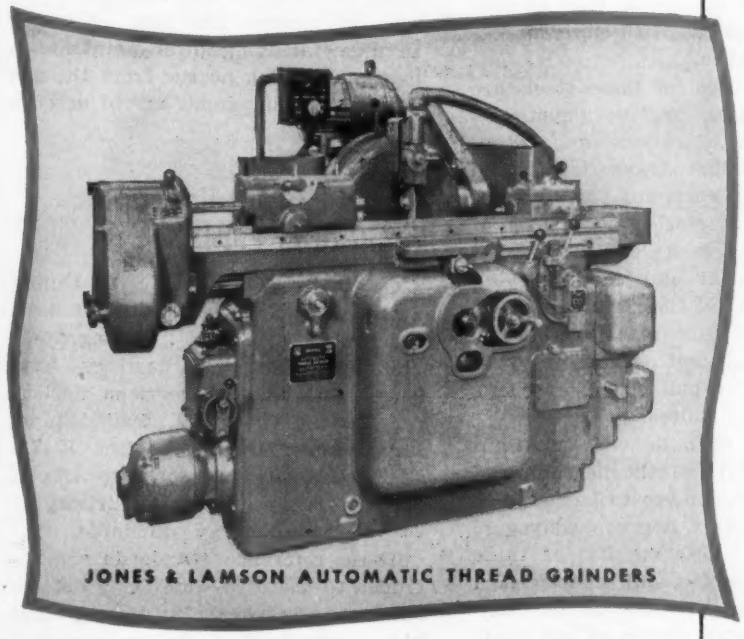


ON AXLE DRIVE PINIONS



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"EXPENSIVE HAND DIE OPERATIONS ELIMINATED"

"NO MARRED THREADS ON THE ASSEMBLY LINE"

"WHEEL COST PER PIECE LESS THAN THREAD HOB AND CHASER COST"

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Versatility of High-Strength Steels

. . . described at ASTM-sponsored gathering of metallurgists and engineers in Pittsburgh

WEIGHT saving possibilities through proper design and utilization of high-strength steels were emphasized by H. Malcolm Priest, manager, Railroad Research Bureau, U. S. Steel Corp.'s subsidiaries, in a talk Oct. 31 at the Mellon Institute auditorium before Pittsburgh district members of the American Society for Testing Materials.

In introducing his subject "High Strength Steels—Why, How and Where," Mr. Priest stated that high-strength, low-alloy steels were developed by the steel industry in 1933 to provide a grade of structural steels that would permit important savings in weight in numerous types of construction.

Carbon content is notably low in all compositions of high strength steels, being limited to 0.12 per cent in most instances and not exceeding 0.25 per cent in any of the grades. Manganese, in varying amounts, is universal, he said. Along with carbon and manganese will be found two or more of the elements, copper, phosphorus, silicon, chromium, nickel and molybdenum—constituting the chemical compositions of the principal high-strength steels.

These steels are normally furnished as rolled, annealed, normalized, or stress-relieved, and are intended for use without further heat treatment except for preheating, postheating, or stress-relieving operations which are sometimes used in conjunction with metal-arc welding. Welding makes possible an additional weight saving in eliminating over-lapping materials.

Use of high-strength steels requires no new principles of design. However, certain principles assume greater importance and must be given more extended consideration when designing for high-strength steels.

Because of their low carbon content, high-strength steels do not need special handling in most welding processes. They are readily weldable and preheating is not required to any greater extent than when welding ordinary steel.

One of the outstanding characteristics of high-strength steels is that only two square inches are required to do the work of three square inches of ordinary structural steel in a tension member. Hence high-strength steel makes weight saving possible, with all its advantages.

Since deflection increases with decrease in cross-sectional area of the members, it may become a matter of some importance in the design of structures for high strength steels.

In addition to that for railroad freight cars, Mr. Priest stated that high-strength steels find important uses in the fields of other mobile equipment in reducing weight, providing longer life and lower maintenance costs, because of their greater strength combined with superior corrosion resistance.

Extensive uses for these steels are found in the automotive industry in heavy trucks, trailers and semi-trailers, gasoline truck tanks and buses. Added corrosion resistance of high-strength steels has brought them into use in agricultural equipment. Material and earth moving equipment utilize the strength toughness and abrasion-resisting properties of high-strength steels in power shovels, cranes, bull dozers, ditchers, conveyors and chutes.

Thousands of mine cars are built of high-strength steels, he said, and other applications are to be found in mine hoists, skips, hoppers, conveyors and screens. Growing use of these steels is in barges, hull construction of ships, inner bottoms, decks, bulkheads and hatch covers of ore boats and miscellaneous accessories.

In the structural field, long span bridges become so heavy that weight reduction is desirable and high-strength steels are employed. Building construction does not generally provide a suitable field for high-strength steel as weight reduction is not usually important or economical. Where structures are to be shipped long distances, as in the export field, weight reduction can effect real savings in transportation and in handling and erection costs.

Structural members are proportioned on the basis of working unit stresses, derived by dividing a strength property of the steel by a suitable factor of safety. Most designs are based on the yield point, since it is the unit stress at which permanent set begins. Here lies one of the intrinsic values of the high strength steels for they have a minimum yield point averaging 50,000 pounds per square inch as compared with 30,000 to 33,000 pounds per square inch for ordinary steels.

In all applications of high-strength steel, Mr. Priest stated the designing engineer has three different approaches to the problem of lightweight construction:

(1) To design the structure to have the same life as one built of ordinary copper steel but with a substantial weight saving.

(2) To design for the least dead weight to secure the greatest economic advantages, but at the risk of a somewhat shorter service life.

(3) To use the same thickness of sections as in ordinary steel and secure greater strength and longer service life.

Final choice is governed by economic factors involved in the application, he said. First cost, cost per unit of service life, and operating savings (including lower maintenance expense), which accrue from the use of modern equipment, are to be considered.

Cast Steel Radiographic Standards Published

Originally developed by the United States Navy, two sets of standards covering industrial radiographic standards for steel castings have been published by American Society for Testing Materials, Philadelphia. Issued under the designation E 71-47 T, there are two separate sets of radiographic negatives comprising x-ray and gamma ray standards.

These reference standards are intended to assist in classifying defects which may be revealed in castings that have been subject to radiographic inspection, the society states. Negatives cover defects which are occasionally encountered and are divided into groups according to the type of defect. The printed procedure, giving a description of the radiographic standards, is offered without charge, but is of little service without negatives, for which a charge is made.

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Fig. 1—(Left) Automatic machine shown welding a circumferential seam on a typical propane tank; vacuum flux remover is in operation at left center

Fig. 2—(Below) Propane tank fabrication line, showing bending rolls, welding clamp, turning lathe, weld positioner and test setup

By GERALD ELDRIDGE STEDMAN

Automatic Joining Method

. . . involving horizontal arc welding used to turn out petroleum tanks on production-line basis

FABRICATION of butane and propane liquefied petroleum tanks at Butler Mfg. Co.'s Kansas City, Mo., plant involves the use of line production methods and several original automatic welding techniques. The company makes an extensive line of truck tanks, transports and trains, buckets, etc. and various types of stationary tanks.

Main work in tank fabrication occurs in a 72 x 300-foot area of one factory wing. Minor work and small fabrication such as feet, tubes, backup strips occurs elsewhere. Tank heads are fabricated outside, deep draw of these hemispheres being a specialized fabrication which Butler, because of its unusual plant load, is not presently attempting. Two steels are involved, firebox and flange.

Firebox type sheet steel is bought to size except for trimming. Ends are trimmed on a Niagara 8-foot power shear of ½-inch capacity.

Work proceeds to a Webb 8-foot pinch-type roll. The bending roll is elevated on backside and usual setup is to have a mechanism standard at rear to indicate how far the roll has run. This was inadequate for accuracy being in half-concealed position and susceptible to dust coatings, so the company originated a special magnified indexing device which allows much more precise setting of this roll; this assures uniformity of diameter and very accurate matching for automatic welding.

Work then passes to a unique automatic horizontal arc welding machine designed by the company. General operation involves pushing in the rolled shell and then two hydraulic cylinders, activating a lever mechanism, pull shell edges tight above backup strip and against a copper beam to make ready for weldment. Work comes to welding roller loading truck by overhead 5-ton crane. Shell travels down this track the length of the machine to automatic stop. Either two or three shells can be loaded, depending upon size, backed up against

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each other. Machine bed is 10 feet. Diameters up to 48-inches can be accommodated.

After the work is pushed in, it is locked in place by a cross gate which supports the copper beam against which the edges to be welded are tightly positioned. Longitudinal back-up strip for this weld rests on the beam. A hydraulic cylinder on each side actuates a lever that controls arms which make the tight closure of the shell edges over the back-up strip after it is positioned on the bed.

An automatic welding head, using the submerged arc method in which the weld is made out of the presence of oxygen under a running bed of flux, makes a single pass weld, travelling at 16 inches per minute. Steel is 0.343-inch, A-212. Powdered flux is picked up after the single pass by a vacuum-type recovery unit. There are five such heads used by Butler in this type of automatic welding operation in its tank fabrication.

After longitudinal weld, work is passed to a specially designed lathe where the shell is cut down to head thickness and ends squared so the head will fit true. To assure a clean edge and chamfer, this special lathe was designed by the company's tooling staff. It is an exclusive development in both design and construction.

An air-operated hoisting platform is pitted under the bed of the lathe. Shells are rolled onto it and hoisted into bed position. Tail stock of the lathe is horizontally operated by hydraulic cylinder. Shell is then forced over and inside a collet type chuck which has two purposes: (1) to provide driving power to turn the work; (2) to assure enough chuck pressure to set the diameter to perfect roundness.

Cut-off and chamfer are made simultaneously. Cut is made as the work turns at from 6 to 8 revolutions per minute. Chuck collet is in 12 segments, hydraulically operated. After cutting, diameter is checked. If there is out of roundness, sufficient pressure is placed on the shell by this segmented collet to give it such make-fit stretch as to accommodate the head truly.

Next operation is to install head and back-up strip for the circumferential seam. These heads have been previously made ready with spuds, dip tubes and fitting holes to accommodate rain cap, relief, return and fill valves, pressure gage, expansion pipe, low pressure regulator, rotary gage and house line valve . . . all these comprising the functioning fittings of the tank. BMC buys these hemispheres and does the machining necessary to install the fittings.

Back-up strips for the round weld are fashioned with protrusions to keep head and shell diameters apart for welding purposes. Head is installed in the shell, both equally divided against the back-up strip. Fit is sufficiently snug as to require very little tacking.

Round weld of head and shell is then made on another special machine. Work is rolled on channel iron track into the welding positioner. This machine uses hydraulic end-pressure to hold head and shell as well as to maintain uniformity of pressure in the revolution of the work to effect the circular weld. Both ends are welded simultaneously by two automatic welding heads, one on each end of the machine. Weld travel is identical with that previously described, moving at 18 inches per minute. Machine can accommodate diameters up to 40½-inches and the 134-inch overall length of the 500 gallon tank. Two of these 500-gallon tanks are mounted side by side to form the mated, twin tank transport.

To produce the large 1000 gallon tanks heads and shell are assembled and chain tightened and thoroughly tackwelded. They are then loaded on a Reed turning roll, equipped with a lifting device. This eliminates need of crane to load and unload, tank dimensions being too great for that sort of handling conveniently. Turning roll is powered electrically, drive being on the right hand rolls. This machine can accommodate 42-inch diameter and has a 14-foot beam.

Thereafter, fabricated tanks move to a large area where inspectors of the Hartford Steam Boiler Inspection and Insurance Co. make complete and independent tests. U. L. and ASME specifications and code requirements are the control. Some of the specifications involve a 300 pounds per square inch hammer test of all seams, and a static pressure test of 400 pounds per square inch by water for a vessel of 200 pounds per square inch working pressure.

Work is then moved on roller dollies (built to carry work to topside and roll) to paint spray booths, after which red instrument shields are installed. Final appurtenances, before mentioned, are installed and a special panel is secured which carries all technical information. Work then goes to stock and shipping.

Metallurgy Developments

(*Continued from Page* 100)

electropolishing have been rapid in the past few years, particularly for the stainless type steels, which generally employ strongly acid baths. The silver process, on the other hand, employs an alkaline cyanide bath.

Typical operation of the new process, as demonstrated before the Electrochemical Society members, involves the handling of spoons, knives, and forks which are given an electroplated coating of silver from the usual cyanide bath. These articles remain mounted on their regular plating racks during the electropolishing operation, which involves simply lifting them directly from the plating bath into the polishing bath, without an intermediate rinse. It was stated that the polishing solution can be made a part of a regular automatic plating line. The solution used is covered by patents, based on the Arthur D. Little work.

A typical composition that has been described consists of 4 to 6 ounces Troy metallic silver per gallon, added as $KAg(CN)_2$, 4 to 5 ounces per gallon potassium cyanide, and 6 to 9 ounces per gallon potassium carbonate. A current density of 10 to 20 amperes per square foot is maintained for polishing. It was reported that control of the solution is simple and involves only periodic analysis for silver, free cyanide, and sodium carbonate, which differ in no essential part from the normal control routine for any silver plating bath.

In the scientific-technical session on electrochemical methods of laboratory control, presided over by E. A. Arnold, Case Institute of Technology, H. A. Robinson, of Dow Chemical Co. described an instrument suitable for production use in automatic potentiometric titrations. Control of many processes, which are also applicable to metal working operations, has greatly increased in recent years, not only in large production units but in smaller plants as well. The instrument, shown in Fig. 2, automatically performs and plots a potentiometric titration and has been successfully operated for a period of several years. The operation is such as to relieve the analyst of all titration work except that of preparing the samples and occasionally replenishing the supply of the reagent.

Apparatus comprises a modified Leeds and Northrup potentiometer-recorder, which controls and records the titration, and a reagent feeding device designed around the glass hy-

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63S-T	35,000 p. s. i.	30,000 p. s. i.	16.53
61S-T	45,000 p. s. i.	40,000 p. s. i.	20.30

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podermic syringe. Use of a completely closed reagent dispensing system facilitates work with reagents that are either volatile or susceptible to atmospheric contamination or oxidation. Titrations are performed in stepwise fashion and are so controlled as to permit the recording of equilibrium potential values. The rate of reagent addition is regulated by the intensity of the buffering action.

Titrations are carried out in a reproducible manner and the plotted curves provide more significant detail than most manual titrations. Samples requiring 10 cubic centimeters of reagent can be titrated in about 15 minutes with an average precision of approximately 1 per cent in the case of ordinary acid-base titrations. The instruments has been used for ordinary routine analytical work and general investigation. According to Robinson it is particularly applicable to exploratory work where a carefully plotted titration curve is essential. Typical titration curve involving the determination of iron is shown in Fig. 3.

Method Has High Versatility

While much of the literature relative to the potentiometric method emphasizes its application to quantitative analysis, the strictly quantitative, analytical uses, according to Robinson, comprise a relatively restricted area of application, as contrasted with its potentialities for general application in the laboratory and plant. Distinguishing features of potentiometric methods are a high degree of versatility and the ability to supply information not obtainable by conventional titration procedures. In the broadest sense it provides both a technique for quantitative analysis and a research tool with which an electrolyte may be investigated relative to the identity, concentration, and chemical conduct of certain of its ions.

For general analytical work Robinson maintained that potentiometric titration offers a number of actual or potential advantages over conventional titration procedures using visual indicators. Some of these are as follows:

(1) If desired, the potentiometric method may be made to provide a continuous and detailed record of the entire course of the analytical reaction involved. For routine work this is of interest insofar as the shape of the curve enables the analyst to check on reaction irregularities resulting from improper maintenance of the physical conditions or unforeseen interference by foreign ions.

(2) A single indicator electrode, sensitive to a given ion or a specific solution property, may serve to detect the end-points of all analytical reactions involving that particular ion or solution property. This feature makes possible the determination of several different substances in a single titration and permits the employment, for analytical purposes, of reactions which, for lack of suitable visual indicators, migh otherwire not be utilized. The above characteristics are especially useful in the selection of visual indicators and the development of routine analytical procedures.

(3) Ease and precision of endpoint detection are not ordinarly impaired by certain optical properties, such as color and turbidity of the sample, which sometimes precludes the use of visual indicators.

Other factors pertaining to modern methods of electrochemical technique of laboratory control were discussed. James J. Lingane, Harvard University, presented a paper on the analytical applications of controlled potential electrolysis. From the research laboratories of Leeds and Northrup Co., G. A. Perley presented two papers of practical interest in the development of electrochemical methods of control. One was entitled "Hydrogen Gas Electrode Measurements", and the other, "An Industrial Salt Bridge Junction Tube". Mr. Perley stressed the fact that rugged industrial types of apparatus are available to assist in the development of modern methods of control utilizing these electro-chemical principles.

Calcium Control Difficult

Lead-calcium alloys are fairly widely used in certain industrial applications. Their full commercial development has been seriously retarded by the difficulty of calcium control, according to G. M. Bouton and G. S. Phipps, of Bell Telephone Laboratories, Murray Hill, N. J., in describing a method for the rapid determination of the calcium content of lead-calcium alloys by titrating in the molten state with metallic antimony. It was pointed out, that using chemical methods hours of skillfull analytical work are required to determine the calcuim content of a melt prior to casting and further hours are needed to determine the rate of change of calcium content as casting proceeds. The new method described permits the making of calcium determinations "on the spot" with high accuracy, with personnel unskilled in analytical methods, in a matter of minutes.

Method described by the Bell Telephone Laboratory workers proved effective in the range from 0.005 to at least 2.0 per cent calcium, which is reported to cover most of the commercial lead-calcium alloys, including addition alloys. Basis of the method is the quantitative removal of calcium by antimony to a sharp endpoint that can be detected visually on test castings. It is known that calcium and lead cannot remain separate entities in molten lead at normal casting temperatures but react, probably to form an intermetallic compound which flats to the surface until only the element which is in excess remains in solution in the melt. This phenomenon permits the subtraction of known amounts of calcium from high calcium alloys by the addition of easily calculated quantities of antimony.

End-Point Easily Recognized

According to the developers of the method, the end-point involved is easily recognized. It depends on a marked difference in the surface appearance of test ingots, which corresponds to a slight change in calcium content in very dilute lead-calcium alloys. An ingot of high purity lead, chill-cast into a shallow mold, shows a faint bluish film. Addition of 0.002 per cent calcium causes the surface to assume a brilliant luster similar to that of a still pool of mercury. A slightly increased percentage of calcium causes a distinctive gray film to form on the surface of the ingot. It was stated that with a little experience it is easy to recognize the surface appearance of test ingots of high purity lead plus various percentages of calcium.

A condition at which a faint trace of gray film is present is called the end-point for an alloy containing 0.005 per cent calcium. Thus, for example, it is possible by adding successive known portions of antimony to an alloy of unknown calcium content to determine the exact point at which the residual calcium is 0.005 per cent. Also, by conducting casting tests on a series of alloys whose calcium contents have been determined by precision analytical methods, equivalence values between amounts of calcium and antimony can be established.

In a paper describing research carried out to study the mechanisms of chromium plating and also the phyisical characteristics of chromium plate, C. A. Snavely, Battelle Memorial Institute, showed that in chromium plating the solution composition and other plating factors can be adjusted so that chromium deposits either as a metal in the body-centered cubic crystal arrangement, as a hydride in the hexagonal arrangement,

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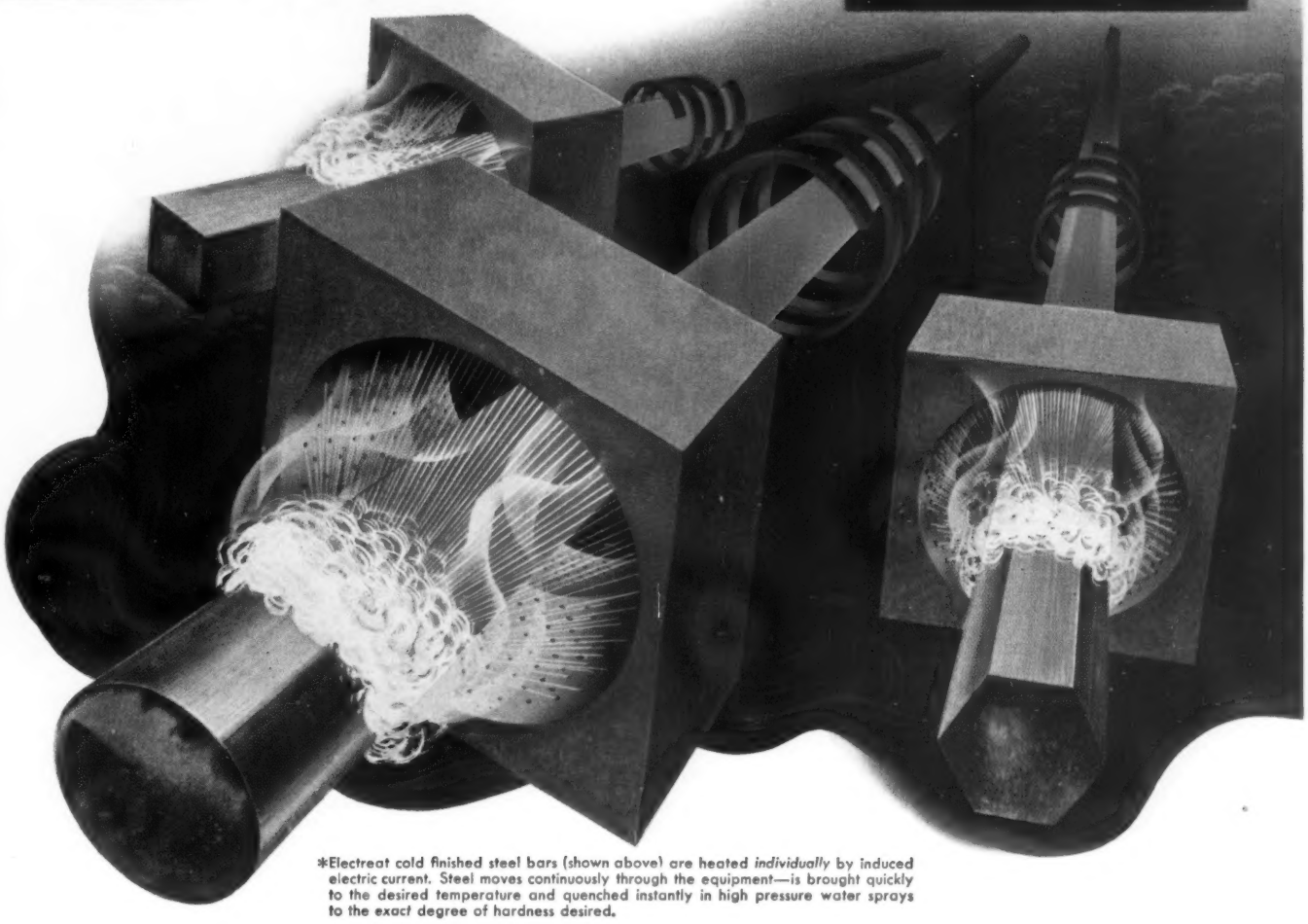

*Electreat cold finished steel bars (shown above) are heated *individually* by induced electric current. Steel moves continuously through the equipment—is brought quickly to the desired temperature and quenched instantly in high pressure water sprays to the exact degree of hardness desired.

You save money and time—Electreat cold finished carbon steel has been found to perform equally as well as more costly alloy steels for certain types of work. Used in place of batch-treated bars Electreat reduces stock waste because *every Electreat bar* is *uniform* throughout.

Because it can be supplied with soft *ductile interiors* that permit *easy machining*, Electreat is especially desirable for fast production of nuts, gears and other parts where the center is machined out of the bar. No further heat-treating of parts made of Electreat is necessary—you save the time and cost of heat-treating.

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Electreat cold finished steel is available in round, square and hexagonal bars. To get information on its use in producing better products *faster* and at *lower cost*, write today for booklet "J&L Electreat Steel". Address Cold Finished Sales Department, 719 Jones & Laughlin Building, Pittsburgh 30, Pa. or contact your nearest J&L Sales Office.

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J&L Electreat Cold Finished Steel will improve your product—Save money, time and steel

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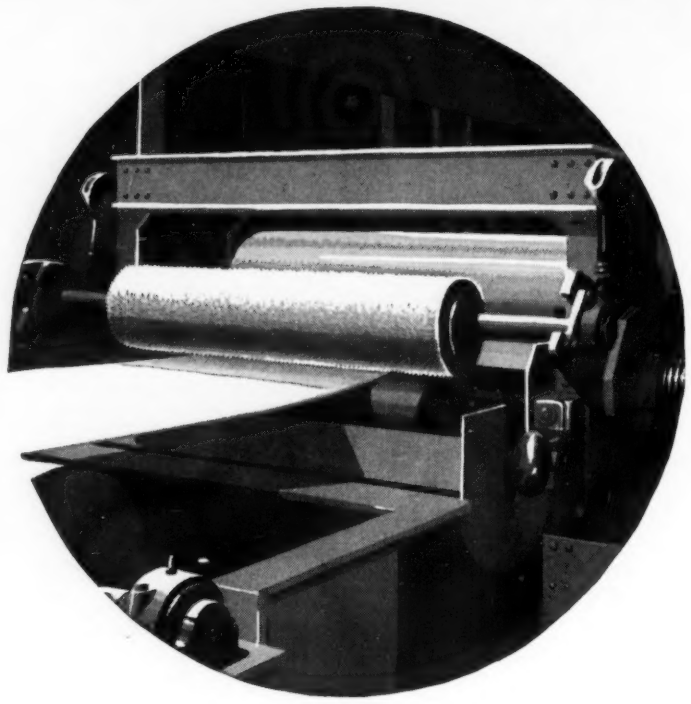

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Why the Pittsburgh Plate Glass Company Makes Brushes

As a leading manufacturer of paints, Pittsburgh found that a reliable source of quality brushes was necessary for the proper application of its products. For over 40 years, Pittsburgh has made its own paint brushes. It was a natural step to extend its engineering and manufacturing facilities by developing production, maintenance and power-driven brushes engineered to the specific needs of industry, since many types of power-driven brushes are employed in our own production processes.

Finish up with a Pittsburgh Power-Driven Brush

● A Pittsburgh Brush does the job fast and gives you a uniformly finished product. You can depend on Pittsburgh Brushes for better performance, enduring economy, and a minimum of lost time in changeovers. In the complete Pittsburgh line are brushes of all types, including "Perfect Balance" sections, wheels and section assemblies, Uni-Fill scratch brushes, as well as paint and other maintenance brushes. ● Consult with the Pittsburgh engineering representative. He will gladly work with you in developing any type of power-driven brushes to meet your particular finishing requirements.

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or as a hydride in the face-centered cubic arrangement.

Hydrogen atoms are interstitially placed in the hydrides. The body-centered cubic plates are stable, but the hydrides are structurally unstable and decompose with shrinkage in volume to form body-centered cubic metal and hydrogen. Experimental evidence, such as represented by photomicrograph shown in Fig. 4, was presented to show that the decomposition of these hydrides into hydrogen and chromium metal, while resulting in considerable shrinkage in volume, is also accompanied by cracking of the plate.

It is considered significant in Snavely's work that the same plating conditions which produce the hardest chromium plate also produce the brightest plate. There is the possibility that the same cause, the fine grained character of the plate, may underlie both the hardness and brightness. In order to be bright, it was pointed out that a plate must be extremely fine grained or be composed of perfectly oriented crystals with a thickly populated plane parallel to the plate surface. Dull plates, it was shown, generally consist of coarse randomly oriented grains or of powdery aggregates which function in the same manner as coarse crystals in scattering light. Thus, from this study it was concluded that fine-grain size and near perfect preferred orientation remain as the basic factors accounting for the brightness of chromium plate.

Metallographic examination of chromium plate by Snavely, also showed that the number and length of the inclusions in chromium plate indicate the amount and stability of the chromium hydrides originally laid down. The amount of the hydride is determined by the bath composition and the plating conditions. The rate of spontaneous decomposition of the deposited hydride is determined by these factors and by the temperature of the plate immediately after it is deposited. This temperature, it was pointed out, will be in general, the same as the plating bath temperature. Thus, according to Snavely, using the principles developed in this research, it should be possible to examine a chromium plate of appreciable thickness under the microscope and approximate rather closely the bath composition and plating conditions employed in depositing the plate.

It was pointed out in a paper by M. R. J. Wyllie, describing the method for measuring the ductility of chromium electroplates, that any practical "ductility" test for electrodeposits is in reality a test of their ability to conform to the shape of the base metal, without cracking, when the latter is subjected to deformation. On this basis many of the commonly used tests of adhesion serve also as a measure of the ductility, or the deformation ability of the deposit being tested. Work carried out by Wyllie was aimed at devising a more quantitative test for measuring the deformation ability of chromium electrodeposits produced directly on steel or ferrous materials. This kind of deposit is becoming of increasing importance in many industrial chromium applications, and also is used in the coating of gun bores and cylinder walls of internal combustion engines.

The type of test best suited to quantitative development appeared to be that designated as "tensile straining", using a test specimen such as is shown in Fig. 5, and measuring the extent of deposit cracking, resulting from the elongation of the chromium-plated test pieces. The elongating force was applied vertically to the test piece using an Avery 4000-pound tensile testing machine. Elongation was carried out to 1 per cent of the length of the test specimen. The Dubpernell test was adapted for assessing quantitatively both initial porosity and cracking of the deposit through to the base metal after elongation.

Open-End and Box Wrench Recommendation Approved

All double end, open-end and box wrenches of alloy carbon steel, except those having openings that are not based on standard bolt sizes, are covered in simplified practice recommendation R220-46 which has been reaffirmed without change, according to a Commodity Standards Division of National Bureau of Standards announcement. Printed copies are available from the Government Printing Office, Washington 25, D. C.

RECORDS X-RAYS AT MILLIONTH-OF-A-SECOND: Valuable tool for fundamental research as well as pointing the way to possible future industrial applications of x-ray equipment is shown here. It is an electronic x-ray counter capable of recording accurately x-rays at millionth-of-second speed over a wide range of intensities. Simple in construction, the instrument consists of a photomultiplier tube wrapped in a sheet of fluorescent screen which is itself wrapped in black paper. Here, Dr. Fritz-Hugh Marshall, Westinghouse research engineer, is shown placing the black paper over the white fluorescent screen that surrounds the tube. When the device is in operation, the rays are beamed directly at the tube. Black paper blocks out all room light but allows x-rays to penetrate to the screen, causing it to fluoresce. This sets up a tiny electric current in the tube which then is amplified one million times to make possible measurement of changes in radiation intensity

Quality Control

(*Concluded from Page 93*)

capable of sampling, testing, interpreting results, and making disposition of inspected items accordingly. To be efficient, such a department should be located in or very near the plating department for best operation and service. This is particularly true in the case of "courtesy" thickness checks concerning which more will be said later.

With these factors in mind, and in order to impress on the minds of apprentice quality control operators the need for an impartial and unbiased attitude which must prevail at all times in inspection work, it was decided to conduct a training course in a location removed from the plating department. The works laboratory provided an ideal locale for the instruction which was administered under the guidance of the engineer in charge of electroplating operations. Two courses were organized which would prepare trainees for either solution control or plate thickness control.

Metals Recognized by Color

Instruction in the latter course included the use and operation of the conventional magnetic thickness gages for nonmagnetic electrodeposits such as chromium, copper, zinc, cadmium, nickel, silver and tin on magnetic base metals, and the use of chemical drop, jet and immersion test procedures for electrodeposits on both ferrous and non-ferrous metals. A seemingly insignificant but highly important portion of the training program involved teaching the operators to recognize various electrodeposits and base metals by their general appearance and color.

For example, in testing thickness of tin electrodeposited on a variety of base metals, it was necessary for the operator to be acquainted with the appearance of the base metal to better appreciate and recognize the end-point of the test. Operators were also taught to recognize satisfactory electrodeposits on the basis of other properties in addition to thickness, and to associate the various electroplates with their corresponding finish numbers as they might appear on engineering blueprints.

During the period of instruction, hundreds of tests were run on sample panels coated with the various types of electroplates in thickness corresponding to actual specification plating later to be encountered in the plating department itself. Zinc, cadmium, nickel, silver, copper, tin, and chrome plates were tested and measured on three base metals, by two or more procedures, including in all cases a very accurate determination by a microscopic method conducted by a skilled laboratory technician.

Microscopic Method Serves as Guide

Although the microscopic method is too time-consuming for use as a practical control method, it was invaluable as a guide and umpire test in the training of operators and establishing their proficiency in the use of more rapid so-called "factory" test procedures. When thickness test results of trainees agreed consistently with microscopic results within a tolerance of plus or minus 15 per cent and when operators proved themselves to be familiar with all the other requirements and properties of quality electrodeposits, they were transferred along with the necessary test equipment to the quality control station in the plating department as qualified operators. Here another short period of instruction was given in blueprint reading and the use of thread gages.

In a similarly thorough manner other operators were instructed in the proper procedures for sampling and analyzing plating solutions. This training also included the interpretation of results, and the application of a limited amount of calculation so that they could recommend definite additions to solutions requiring adjustment. The analysis for principal metallic components of plating baths as well as other essential and active ingredients were studied along with measurement of hydrogen ion concentration and care and handling of poisonous or corrosive chemicals. When qualified, an operator was allowed to function in the quality control station under the jurisdiction of the plating foreman and under the guidance of the engineer in charge of electroplating operations.

One of the early and now constant functions of the thickness control operators is the "courtesy" check for platers. This is a thickness determination on a few samples, usually taken from a barrel load at a point about 50 to 75 per cent through the run, according to the plater's calculations. A definite thickness reached up to that point, combined with the ampere hours consumed gives the plater an excellent idea of the additional time required to meet the ultimate thickness specifications.

All platers quickly took advantage of this service, which did much to eliminate the plating of parts to a thickness considerably in excess of that specified by the interested design engineer. In the case of precious metals, especially, substantial savings have been realized in this manner. Both the "courtesy" and final thickness checks are made on a significant surface or area acceptable to and specified by the engineer.

Quality control in the plating department has been extended to include a weekly record of all adjustments and additions made to plating baths. This report is the pulse of the plating department, and indicates to the laboratory and quality control organization the need to exercise more or less solution control, as the occasion demands.

Another feature which goes hand in hand with the weekly report is the system used on plating baths operated only intermittently. Infrequently used baths are checked and adjusted to the preferred working range immediately before they are put into use. This before-the-fact rather than after-the-fact control prevents the production of unsatisfactory work and the need of stripping and replating.

The advent of quality control has served to assure engineers that all the electroplated components they require have met and passed minimum thickness specifications, have passed all other requirements of high quality plating, and have been thoroughly inspected on the basis of statistically selected samples. The plating department, on the other hand, is reasonably certain that maximum thickness specifications are not being grossly exceeded, and that plating costs and rejections of finished work are maintained at a low minimum.

Chip Breaker Information Available in Chart Form

A chip breaker chart containing detailed drawings and information on preparation of four types of chip breakers is available from Wendt-Sonis Co., Hannibal, Mo.

Drawings show how to prepare chip breakers for general use in continuous cuts on concentric work pieces, for tools having a large nose radius, for light or finishing cuts having a maximum depth of 1/32-inch, parallel type chip breakers for cuts extending to a 90-degree shoulder or on eccentric work pieces.

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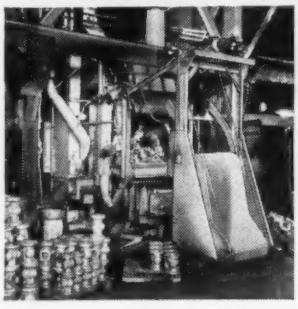
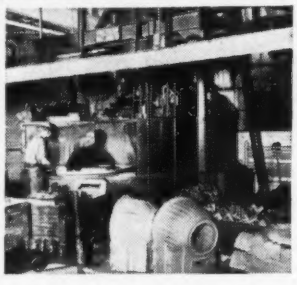
The present need for equipment that will turn the metal cleaning production curve sharply upward and do the job at lowest unit cost places the Airless Wheelabrator at the top of the buying list for shops large and small. And in the Wheelabrator line . . . the most complete on the market . . . you will find the *exact* size and type of machine to meet your requirements, an important fact to consider when you are asked to buy equipment that may be undersized or oversized as far as your particular needs are concerned.



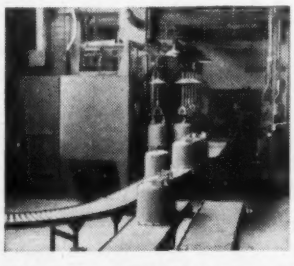
Wheelabrator Tumblasts

The Wheelabrator Tumblast uses the endless conveyor method of tumbling . . . an exclusive *American* feature . . . which completely exposes all surfaces of every piece to the full effect of the abrasive blast. Experience has shown that no other blast mill designed for tumbling work can match its effectiveness. The machine is made in eight standard sizes from 1 cu. ft. to 63 cu. ft. capacity for batch-cleaning heavy pay loads in which individual pieces vary in weight from a fraction of an ounce up to hundreds of pounds.



Wheelabrator Multi-Tables

Multi-Tables are recommended for cleaning flat or fragile work which has high vertical edges or deep pockets. Work to be cleaned is placed upon a series of rubber covered work tables mounted on a main spider platform which rotates on a central spindle. As the platform turns about its axis the tables are carried into the cabinet where they revolve as they pass through the blast from one or more Wheelabrators. Movement of work in this manner provides complete coverage of all exposed surfaces. Built in five models with Tables ranging from 8" to 66" diameter.



Wheelabrator Special Cabinets

American's problem-solving engineers offer you a wealth of experience on cleaning and finishing problems . . . all the way from transforming rough ideas into definite plans, to the installation of tested, ready-to-operate equipment. No matter what your cleaning problem may be come to *American* for the practical, economical solution.

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The Wheelabrator Swing Table is a versatile, hygienic, general purpose blast cleaning machine that will handle 80% of all airblast room jobs. It is also ideal for the shop that requires moderately priced equipment capable of handling a wide range of large and small pieces where the daily production does not warrant the purchase of several different types of cleaning equipment. Swing Tables are supplied with 24", 48", 66", 72" and 86" diameter tables. Write for Catalog 214-A.

Wheelabrator Plain Tables

The Wheelabrator Plain Table, with its single rubber covered work table, is designed for handling work which does not have too many pockets or high vertical edges. It is an ideal machine for the jobbing foundry having a varied production of flat or fragile work. Plain Tables are furnished with 6', 8', 10', 12' and 14' rubber covered work tables. Write for Catalog 204.

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509 S. Byrkit St., Mishawaka 5, Indiana

PROGRESS REPORT ON

Blast Furnace Carbon Hearths

New design of tapping hole affords increased strength and large variation in the drilling angle. Carbon hearth furnaces give more uniform size of casts and respond within two to four casts after a bank to provide suitable hot metal for the open-hearth department

By C. J. FLEISCH

Superintendent, Carrie Furnaces
Carnegie-Illinois Steel Corp.
Rankin, Pa.

THREE partial carbon hearths have been in operation for some time at the Carrie Furnace Plant of the Homestead District Works, Carnegie-Illinois Steel Corp. Data concerning these installations are as follows:

No. 1 Furnace—Hearth diameter of 23 feet and rated at 931 tons per day. Blown in during December, 1945, and has produced 431,879 tons to Sept. 1, 1947.

No. 7 Furnace—Hearth diameter of 23½ feet and rated at 971 tons per day. Blown in during July, 1946, and has produced 375,444 tons to Sept. 1, 1947.

No. 6 Furnace—Hearth diameter of 23½ feet and rated at 971 tons per day. Blown in during November, 1946, and has produced 264,450 tons to Sept. 1, 1947.

Details of the hearth and tapping hole construction and operating experience on these installations follow:

No. 1 Furnace: Starting from 12 feet below the hearth elevation, there are seven courses of hearth and bosh quality blocks, then two courses of carbon blocks, and finally three courses of hearth and bosh blocks. All blocks are laid on end and each course rotated 45 degrees. The hearth and bosh blocks are 12 x 6 x 4 inches, and the carbon blocks 12 x 8 x 4 inches. The top of the hearth carbon blocks is 6 feet below the center of the iron notch.

An 18-inch ringwall of 18 x 11 x 4-inch straight and key carbon blocks is laid against the hearth coolers. This carbon ring wall starts at the bottom of the hearth carbon blocks and is carried up to the top of the

Fig. 1—(Above) Installing ring wall carbon block in No. 6 furnace hearth of the Carrie group

Fig. 2—Spacing bottom carbon block in the hearth of No. 6 stack

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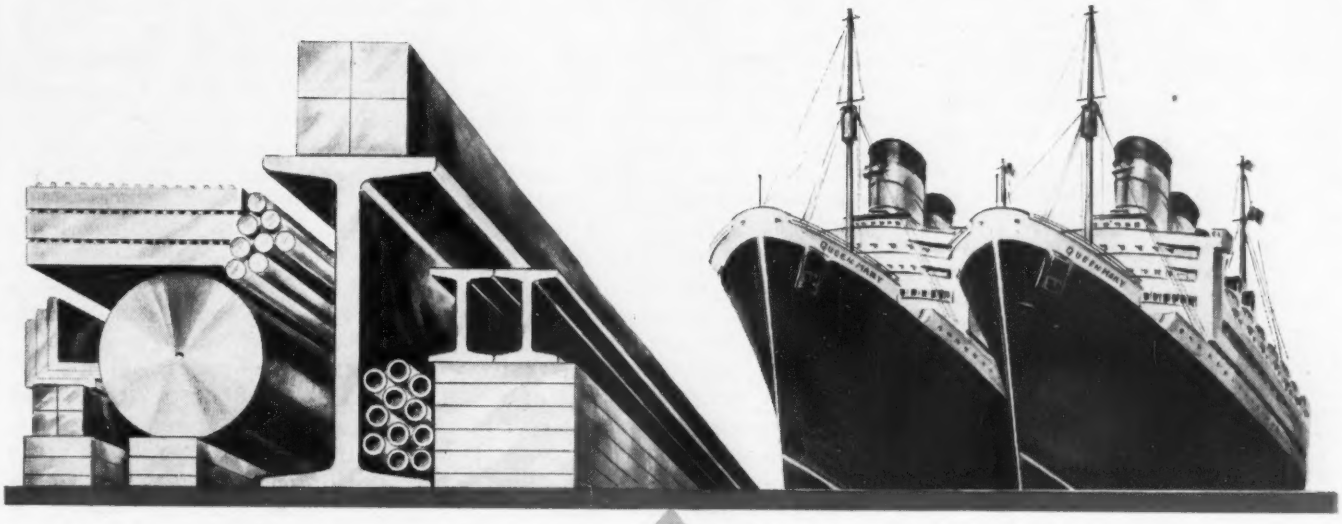

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For example, the first quality firebrick in the suspended roof of a continuous reheating furnace had to be replaced after heating every 45,000 tons of steel. But—when the roof was rebuilt with *B&W Junior Firebrick*, 207,000 tons were run through without shut-down for repairs! And, at the end of the run, the roof was thin but otherwise in good condition.

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hearth cooling jacket a distance of 11 feet 3 inches.

No. 7 Furnace: Construction here is similar to No. 1 Furnace, except in the size of the carbon blocks and final courses of hearth and bosh blocks.

Starting from 15 feet below the hearth elevation, there are 10 courses of 12 x 6 x 4-inch hearth and bosh quality blocks, then two courses of 12 x 12 x 8-inch carbon blocks, and finally two courses of 18 x 9 x 4½-inch hearth and bosh blocks. All blocks are laid on end and each course rotated 45 degrees. Again, the top of the hearth carbon blocks is 6 feet below the center of the iron notch.

As in No. 1 Furnace, the 18-inch ringwall of 18 x 11 x 4-inch carbon blocks is laid against the hearth coolers from the bottom of the hearth carbon blocks to the top of the hearth cooler, a distance of 11 feet.

No. 6 Furnace: Starting 14 feet 6½ inches below the top hearth elevation, there are 10 courses of 12 x 6 x 4-inch hearth and bosh quality blocks, laid on end and each course rotated 45 degrees as in the other furnaces. Then, two courses of large carbon blocks. The bottom course is cut from carbon blocks 15 feet x 30 x 13½ inches. The top course is cut from carbon blocks 15 feet x 30 x 23 inches. All blocks are laid at right angles to the centerline of the iron notch. All joints are a 2 inches minimum and tamped with carbonaceous paste. Finally, there is one course of 18 x 9 x 4½-inch hearth and bosh blocks. From the top of the hearth carbon blocks to the center of the iron notch on this furnace is 4 feet 6 inches.

Against the hearth coolers from the large hearth blocks to the top of the hearth coolers are two rings of carbon block, one inside the other. These blocks are about 30 x 28½ x 11¾ inches, and form a carbon ring wall about 2 feet thick. Between the two rings of carbon is a space of about 2 inches which is tamped with carbon paste.

In addition to the use of carbon in the construction of the hearth, both Nos. 6 and 7 Furnaces were equipped with a one-piece solid carbon cinder notch liner to guard the under part of the opening, carbon being resistant to slag erosion and not subject to slag or gas corrosion. For these same reasons all three furnaces were protected by a ring of carbon brick around the cinder notch and around all tuyere openings.

Tapping Hole Design: Tapping holes on these three furnaces are constructed of special shaped fireclay brick and have several advantages. The first is the simplification of its construction and the increase in strength obtained by the use of large brick shapes rather than the ordinary sized bricks. Whereas the old style tapping hole allowed a small variation in the angle of drill, this new type allowed a comparatively large amount. This is a matter of considerable importance, especially when drilling up for casts following a blow-in from a banking period.

On No. 7 Furnace we experienced a breakout around the tapping hole during a cast ten months after the furnace was blown-in. It was found that about one-third of the iron notch cooling stave insert had been destroyed, however, the hearth wall brickwork seemed intact and the iron notch opening was small and well defined. All indications were that the disturbance was entirely external. Contributing factors were the facts that while special iron notch fireclay shapes were used, there was still an unbroken vertical joint through the iron notch at the adjoining face of the hearth wall and cooling staves; also the fit of the cooling staves to the hearth jacket at this point was poor, which necessitated the opening being filled with grout.

Our experience on the Nos. 1 and 6 installations has been satisfactory. No apparent breaking up of the hole has yet been noticed, so from all indications, they are still in good condition. The new type hole does not seem to make much difference in the number or size of coke messes, other than it seems to make it easier to maintain the length of the tapping hole. Few "short holes" have been observed to date.

Operating History and Conclusion: It has been our experience that the size of casts on furnaces with carbon hearth has been more uniform, particularly on Nos. 6 and 7 Furnaces. The iron analysis takes more abrupt swings from cast to cast which is due to the lack of the cushioning effect of the large pool of iron in fireclay block hearths. We have further noticed that if a carbon hearth furnace gets "cold" in the hearth for several casts, it takes more coke to restore the proper hearth temperature.

While thermocouples were not installed in any of the three installations, it is indicated by the hearth cooler discharge water temperatures that the loss of hearth heat to the cooling water has been higher, with the highest temperature being on No. 6 Furnace where the large carbon blocks were used, this temperature running 5 to 6 degrees Fahr. higher than those on fireclay installations.

No change is noticed in our flushing or tapping practice between carbon and fireclay installations. Some trouble has been experienced on No. 1 Furnace with iron in the slag; however, this furnace has a tuyere directly over the cinder notch which could contribute to this difficulty. Nos. 6 and 7 Furnaces are normal in this respect. No conclusive iron temperatures have been taken; however, a few temperatures taken with an optical pyrometer showed no difference from those taken on furnaces with fireclay block hearths.

Another item of interest was our experience coming in off of bank following a recent shutdown. Five furnaces were banked for approximately eight days. The two furnaces with fireclay block hearths, Nos. 3 and 4, gave more trouble and took a longer period to make iron which was acceptable to the open hearth shop. No. 4 Furnace sent iron on the eighth cast and No. 3 on the ninth cast, while in comparison the carbon hearths No. 1—third cast, No. 6—fourth cast and No. 7—second cast. While this may not be a fair comparison due to the life of the Nos. 3 and 4 Furnaces it is interesting to note. Also the fireclay block hearths skulled up on the hearth walls to a greater extent, causing trouble in getting a proper flush from the monkeys. It took approximately twice as long to get a satisfactory flush from the fireclay block hearth furnaces as it did on the carbon hearths.

From a paper presented before the joint meeting of Blast Furnace & Coke Association of the Chicago District and the Eastern States Blast Furnace & Coke Oven Association, Carter Hotel, Cleveland, Oct. 10.

Other data dealing with carbon refractory of interest to those studying carbon hearths for blast furnaces are as follows:

"Carbon—A Refractory Material," STEEL, April 5 and 12, 1943, pp 106 and 118.

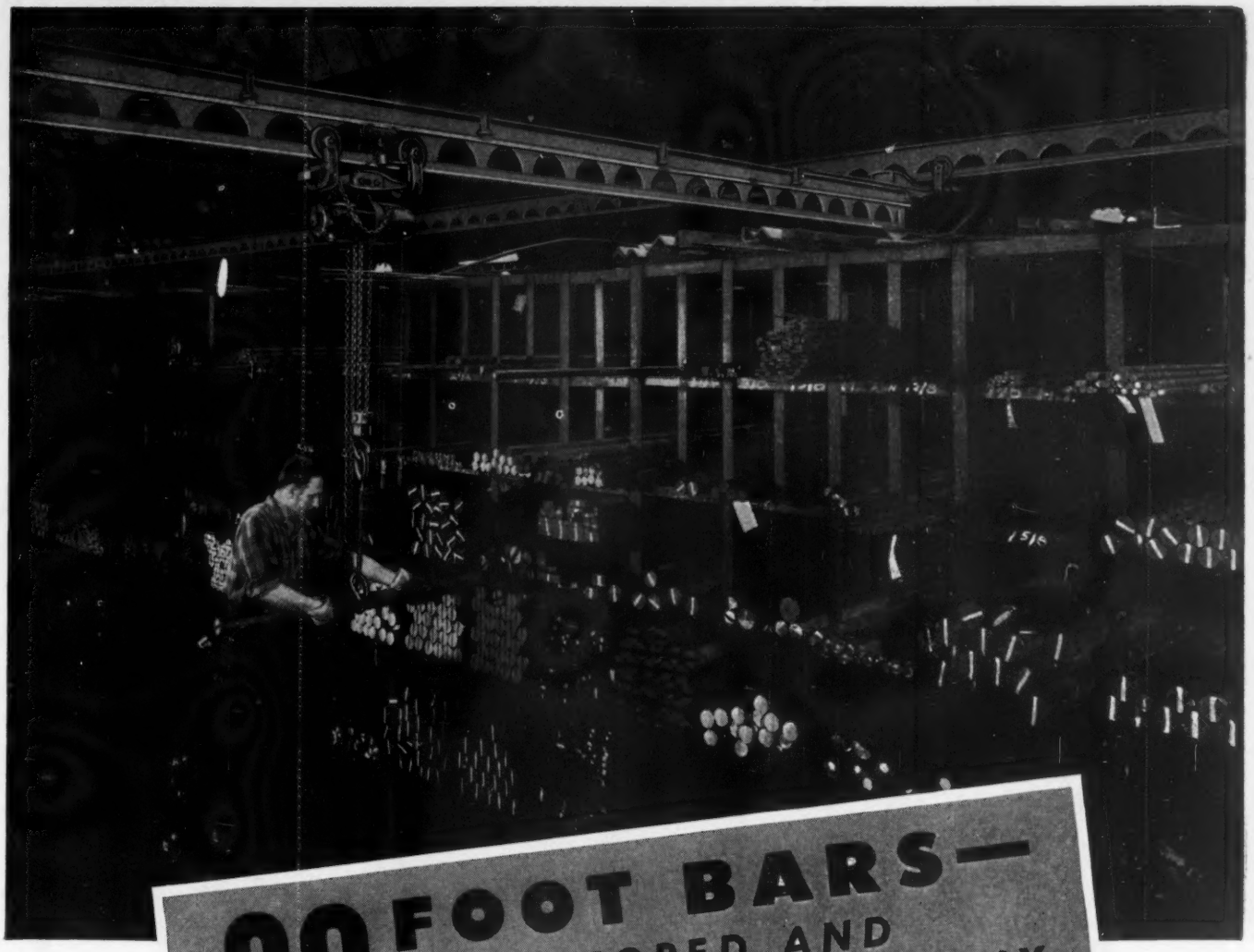
"Carbon Brick for Hearth Linings," STEEL, July 23, 1945, page 125.

"Carbon Lining for Blast Furnaces—Its History, Installation and Advantage", STEEL, Dec. 24, 1945, page 86.

The Editors

Adhesives Standard Published by ASTM

First compilation of physical tests and definitions relating to adhesives—a 48-page pamphlet which includes 12 standards—is announced by American Society for Testing Materials, Philadelphia. Two of these include definitions of terms relating to adhesives and the others are various standardized tests, prepared either by Committee D-14 on adhesives or D-11 on rubber and rubber-like materials, which has developed three methods.



20 FOOT BARS— STORED AND HANDLED EFFICIENTLY

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What a vast improvement this is over the haphazard time-consuming way of storing and handling stock still prevalent in so many plants today. There is no tugging, lugging and back-breaking lifting while searching for stock needed. The stock is always in its place where it is quickly found. There is no uncertainty as to the amount on hand, because the supply is out in the open where it can always be seen.

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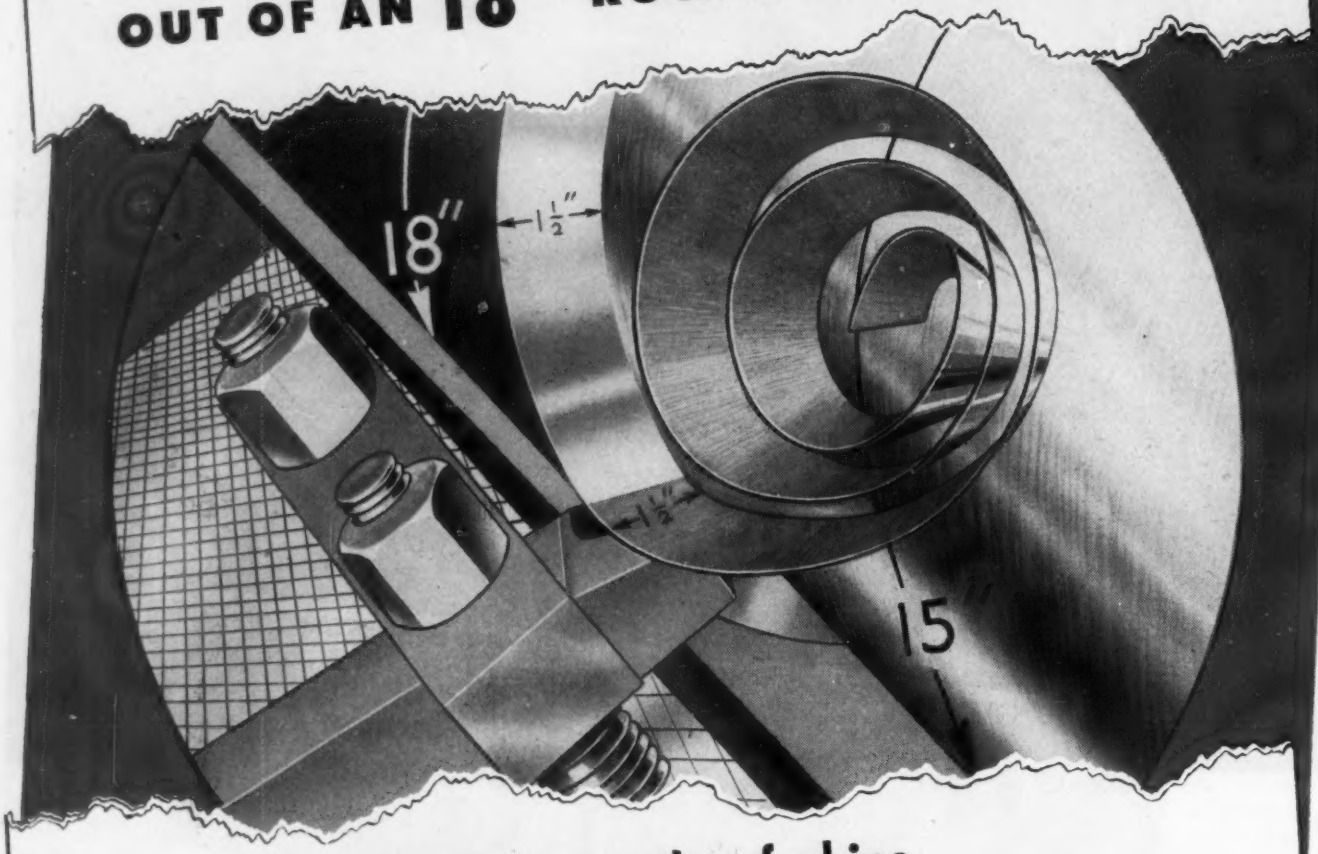

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Carbon Restoration

(*Continued from Page 95*)

It is not uncommon for such decarburized parts to fail when subjected to as little as 50 per cent of designed loads.

This low fatigue life is not the only undesirable effect of decarburization. Many steel parts require medium or high carbon content so that full hard surfaces may be obtained by quenching after furnace heating, induction hardening or flame hardening. Presence of a low carbon or totally decarburized skin on the surface of the metal precludes the possibility of obtaining either full hardness or maximum strength at the very point where these properties are most important. Of what practical use is a heat-treated bolt if the threads are decarburized? By the same token, what purpose is served by hardening a wearing part to full file hardness but leaving a soft surface skin due to decarburization?

The original, and until a relatively short time ago, the only practical method for eliminating decarburization and its bad effects was to resort to machining or grinding. Now, a method is available, and is rapidly gaining favor, whereby decarburization can be eliminated or corrected without resorting to mechanical means and without thereby affecting any change in shape or size of the metal object. This new method known as "carbon restoration" is a gaseous process and it may be applied at almost any stage in the program of converting the original steel billet into a final finished products.

Carbon restoration is the natural outgrowth of the great advances which have been made in the science of gas chemistry. The past few years have witnessed an era of concentrated research development whereby gaseous atmospheres have become so thoroughly understood and so completely controllable that seemingly impossible heat-treating processes are now accepted as standard practice. Carbon restoration belongs near the top in the list of such processes.

This process is not to be confused with gas carburizing in its normally accepted meaning. Basically, gas carburizing is a treatment for establishing a definite carbon gradient starting with high carbon at the surface of the steel and gradually merging with the original low carbon of the core. A carburizing potential of high degree must be maintained if carburizing is to be accomplished in a successful manner.

On the other hand, carbon restoration seeks to remove an undesirable inverse gradient of carbon in the steel. Its success is predicated on setting up an exact carbon balance between the atmosphere and the original carbon in the steel. Figs. 3 and 4 graphically illustrate the fundamental differences between gas carburizing and carbon restoration. The shaded areas represent the carbon added by the two treatments.

In carburizing, depth of carbon penetration is a function of time and temperature. In carbon restoration, the penetration at any point ceases when a carbon balance is reached between atmosphere and steel surfaces and thereafter, time has no effect. This means that the treatment can be long enough to take care of the deepest decarburization without danger of increasing or decreasing the carbon content of those surfaces which were free or nearly free from decarburization before the treatment.

This point is clearly illustrated in Fig. 1. Amola MS267 bolt stock showed 0.006-inch or more of decarburization in the as-received condition. By using carbon restoration treatment, the carbon in these areas was restored to within 0.02 per cent of the original value as determined by actual chemical analysis. For comparative purposes a portion of the original bar was ground to remove all surface decarburization prior to the carbon restoration treatment. As shown in the last photomicrograph C, Fig. 1, neither carburization nor decarburization occurred in this portion of the samples.

Probably the first controlled application of carbon restoration on a

NEW LEASE ON LIFE: Retrieved from the salvage yard of a Southern industrial plant, this 30-year-old Brown industrial crane is shown undergoing strenuous lifting tests to determine the effectiveness of the remodeling job. A 24-ft arc welded section was spliced in the center of the boom to give an overall length of 73 ft. New I-beam outriggers 10 ft long were reinforced by welding on ½-in. plate to box in the beams. To compensate for increased boom length and test loads as great as 48 tons, a box was fabricated on the rear of the crane to hold 6 tons of relay rails to act as a counterbalance. Photo courtesy Hobart Bros. Co., Troy, O.

commercial scale occurred during the early wartime years. SAE-4140 steel bolts for aircraft engines were to be heat-treated to meet hardness specifications of 46-50 rockwell C. A large percentage of these bolts were rejected because of soft surface conditions which oftentimes resulted in hardness readings as low as 32-35 rockwell C. Upon investigation, it was observed that the original spheroidized stock was often decarburized as much as 0.005-inch and this decarburization persisted throughout all operations including final heat-treatment.

A rotary hardening furnace of the type shown in Fig. 6 was installed for heating parts for final hardening. An RX type of atmosphere with correct carbon balance was provided in the heating chamber of the rotary furnace. Rejected bolts were reheated in this furnace and quenched out at 46-49 rockwell C, thus permitting the salvaging of all stock. Thereafter, the furnace and controlled atmosphere were used for final heating of all production bolts and rejection due to decarburization was completely eliminated.

Decarburization Defects Corrected

Since the above-mentioned application of carbon restoration, the process has shown its adaptability in correcting serious defects due to decarburization. One particular application involved a small forging of SAE 4140 steel weighing about ¼ pound and of intricate design. The shape of the piece made contour machining very impractical; hence the forging was pressed to close tolerances.

Fig. 2 shows the surface conditions of the forged part after normal heat-treating practice and after treating by the carbon restoration method. Carbon replacement was complete to within ± 0.03 per cent of the original carbon in the steel.

Benefits of the treatment are emphasized in Fig. 5, which shows a customer's report of Vickers microhardness readings taken at various distances from surface to core of fully heat-treated forgings with and without benefit of carbon restoration. As would be expected, forgings receiving the process treatment have shown no evidence of failure due to surface carbon deficiency. This is in sharp contrast to the high mortality rate which had been observed before the application of the carbon restoration process.

Another interesting application in constant use during the past few years involves the treatment of an assembly made up by welding two or more heavy forged sections into one piece weighing about 155 pounds. The material is SAE 4345 steel. The peculiar contours of inside and outside surfaces plus the size of the assembly make it impracticable to machine or grind off the 0.030-inch of decarburized metal.

In view of the high fatigue and torsional stresses imposed upon this part, it was proved definitely that decarburization could not be tolerated. Solution to this problem consisted in applying the carbon restoration treatment during final heating before hardening. Fig. 7 shows a number of hubs being jet air cooled immediately after carbon restoration.

Process may be carried on in various types of batch or continuous furnaces of the muffle or radiant tube varieties. Regardless of the furnace chosen, it is fundamentally necessary that the furnace be of such construction that the atmosphere surrounding the work be under absolute control at all times. This imposes the necessary requirement of tightness to insure exclusion of air, flue gases and quenching fumes, any of which will affect the composition of the atmosphere in the heating chamber.

A final example of the benefits of carbon restoration, and one which predicts the future trend of this process, comes from the steel industry. In order to produce bar stock that was free of scale and of a specified carbon content from surface to core, it was found that by annealing in a balanced carbon atmosphere, the desired results were obtained. Today the process is used in the steel industry to produce premium-grade steel.

Atmosphere Must Be Correct

In addition to the selection of suitable furnace equipment, it is of the utmost importance that the furnace atmosphere be of correct composition to insure success of the process. Gaseous mixtures of CO, CO_2, H_2, H_2O and N_2 are tools for carbon restoration. Advantage is taken of the well-substantiated fact that definite amounts of each of these constituents in a given mixture will provide an atmosphere in balance with a definite concentration of carbon in steel at any one given temperature.[1]

In view of the fact that the atmosphere gas used for carbon restoration is so important and subject to such close control, it is imperative that the proper type of gas be prepared in the proper type of gas generating unit. Generator employing externally heated reaction tubes containing a catalytic material is shown in Fig. 8. The mixture of air and hydrocarbon gases (natural gas, propane, etc.) heated in the presence of the catalytic material is quickly and completely re-formed to supply an atmosphere predominantly rich in CO and H_2 but containing controllable amounts of CO_2 and H_2O.

These latter are most important since the carbon balance of the furnace atmosphere is in turn controlled by their presence. The generator can be set to produce the gaseous mixture required for any specific carbon at any designated heat-treating temperature. When different steels or different temperatures are to be used, the corresponding change in atmosphere is made by changing the air-gas ratio at the generator.

Problem of periodically checking furnace atmospheres is greatly simplified by the use of the generator gas above described. Water vapor content, once established, in any mixture will reflect even the slightest change in the other constituents of the furnace atmosphere. By dew point determinations it is possible to read minute changes in water vapor content, whereas the corresponding changes in CO, CO_2 or H_2 would be too small to determine by orsat analysis. Therefore, dew point readings are used for control purposes. These readings may be taken manually or by means of automatic dew point instruments. For accuracy and control of the process, the automatic dew point recorder is of utmost importance.

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1. "Carbon Concentration Control" by E. G. deCoriolis, O. E. Cullen, Jack Huebler, Transactions, ASM, Vol 38, p. 659, 1947.

Voltage Comparator Made Commercially Available

Making possible the high degree of accuracy of fire-control computors during the war was the alternating voltage comparator, which is now commercially available to other firms, according to an announcement of Arma Corp., Brooklyn, N. Y., maker of the device. With this instrument, which functions at any frequency between 50 and 1250 cycles per second, laboratory measurement of alternating current voltage and phase angle may be made with a reported accuracy of one part in 50,000.

Range of application of the comparator is said to include the measurement of vectorial ratios essential to computer development; transformation ratio of transformers and networks; power factor of transformers; power factor and Q of resistors, capacitors, and inductors; power factor of alternating current machines, etc.

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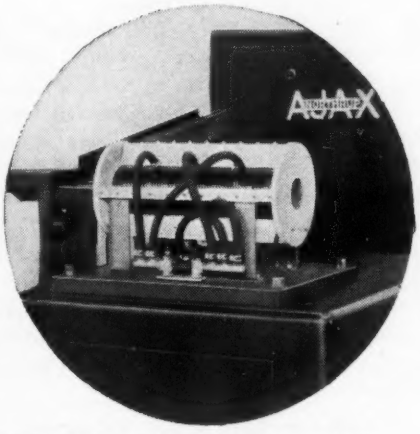

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HIGH-FREQUENCY HEATING-MELTING

Good Vision Program

(*Concluded from Page 97*)

service may be obtained by employing professional personnel as a part of staff and providing adequate facilities, or by engaging the services of an outside practitioner.

The vision specialist, foremen and engineers, working together, determine visual requirements for various types of jobs in the plant. In one steel plant in the Pittsburgh area, which may be considered typical of many, three standards were set up—one for cranemen, another for employees in the die room and machine shop, and another for the shipping department.

Optical manufacturers have developed screening devices and methods to detect quickly and with minimum effort the employees who need visual correction. Visual examination is technical and should be left to the professional practitioner. His examination takes into account various requirements for different jobs. Major points in his analysis are those mentioned above.

In the typical plant about half the employees need glasses. Many who have them do not have lenses properly suited to their job requirements. Some have handicaps that are overcome better by visual training than by lenses.

Learning to See: One of the important discoveries in the science of vision is that seeing is not a simple mechanical process like a camera taking a picture. It involves mind, muscles and nerves. We learn to see just as we learn to walk, and some of us have bad visual habits just as we have bad walking or posture habits. These are often developed when we try to compensate for some visual inefficiency. Eye exercises, in which better visual habits are learned, are assuming great importance in better vision. Visual training is especially beneficial in developing coordination between the two eyes, such as is required for depth perception, for instance.

After lenses are properly ground to prescription the glasses should be carefully fitted by a professional practitioner to make sure that the optical center of the lens is in the proper place and that the exact correction is achieved. How cost is borne is a matter for each company to decide. It has been found, however, that it is difficult to enforce a rule requiring safety goggles unless all or part of the cost is paid by the employer.

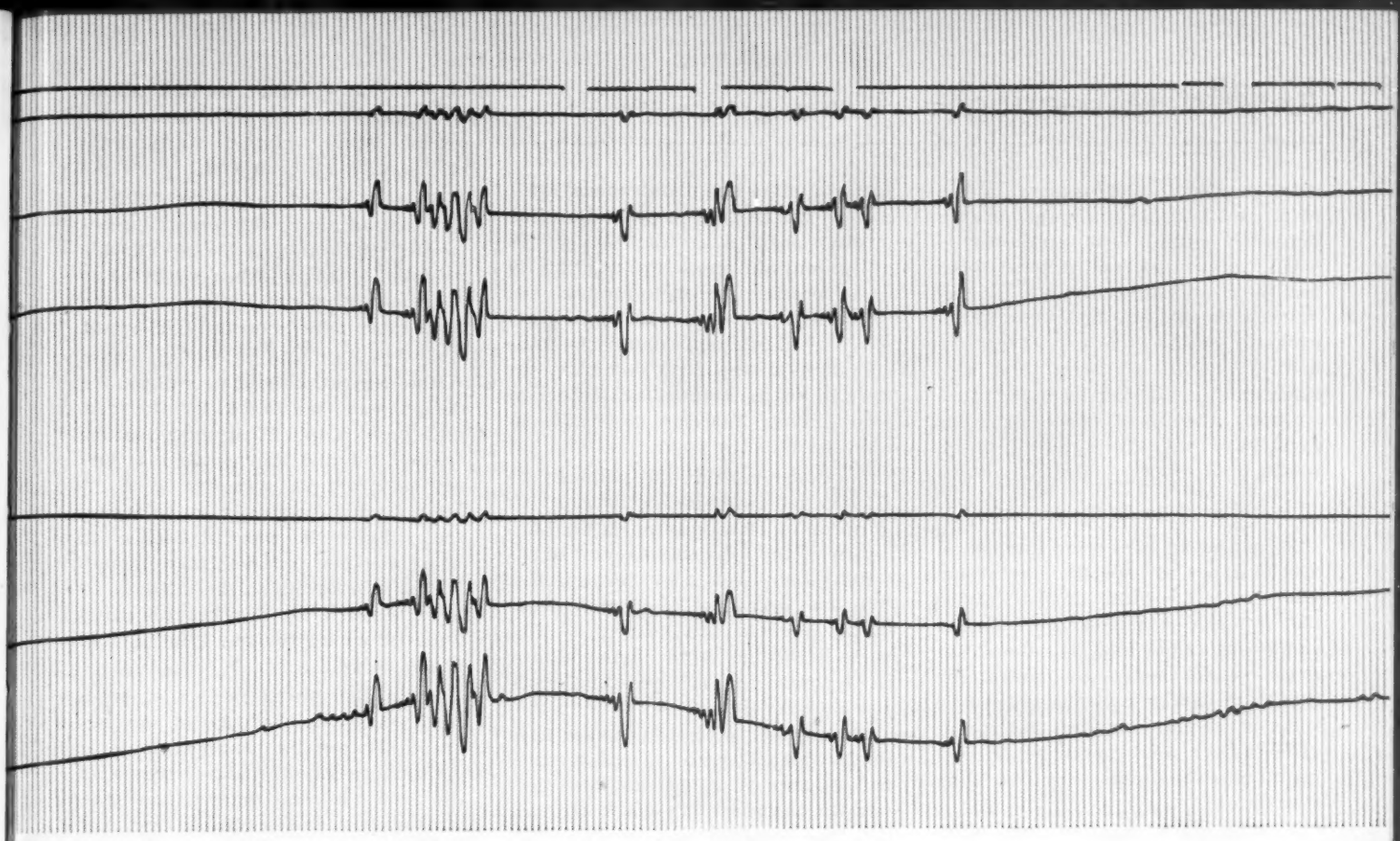
Physical environment in the plant is an important factor of good vision. Light and paint can do much to aid vision. Natural light should be used as much as possible; sometimes rearrangement of floor plans can place critical work in better light. Where artificial light is necessary, expert advice should be sought to make sure that lighting is adequate and that there is a minimum of glare. Paint should be used to bring out contrasts where needed and to make the surroundings pleasant.

A vision program must have the full co-operation of all employees if it is to be successful. It should be thoroughly explained in the company house organ and at employee meetings. Union officials and foremen should be informed so that they can answer questions and help enlist the support of employees. There is often a tendency to fear that the vision program is a scheme to screen out undesirable employees. It should be made clear beyond question that the objective is to improve vision of employees for safety and better workmanship. The comprehensiveness of the tests should also be explained, because many, especially older employees, think in terms of "weak" eyes and "strong" eyes without realizing that no one has perfect vision by all the standards required in different industrial jobs.

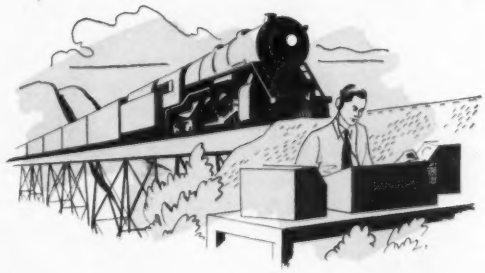
When employees understand the vision program and become vision conscious they will be less inclined to keep their safety goggles in their pockets and to conceal their visual inadequacies. They will wear their glasses and safety goggles and urge others to do so. From the standpoint of safety it should be emphasized that the employee with inefficient vision is not only dangerous to himself but to his fellow workers. Safety in a plant is a mutual as well as an individual responsibility.

Continuous Program: To sustain a high level of vision and safety there must be frequent rechecks. Visual capacities change, especially among older employees, and many inadequacies are unnoticed until they are pointed out. Furthermore, conditions in a plant change. As equipment ages or new machines are installed, lights grow dim and paint becomes grimy. Workers change from one job to another and may need different capacities. All these factors make it necessary to carry on a continuous program.

HOT PIERCING WATER: Quenching, one of the most ancient of steel treatments, may be done in oil, air, water, brine and other media to give the quenched piece new physical hardness. View above, taken with an exposure of 1/10,000 of a second, shows what happens in an experimental quenching operation in the Research Laboratory, U. S. Steel Corp. of Delaware, Kearny, N. J., when a square bar of white-hot steel is "dunked" in the quenching medium. The hole, which is really filled with invisible water vapor, doesn't last long enough for the unaided eye to catch it



Picture of a bridge groaning under load...



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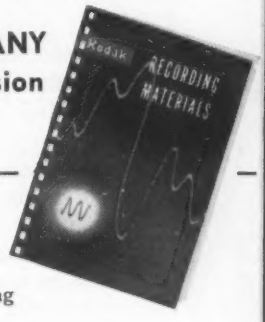

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Antifriction Bearings

(*Continued from Page* 91)

ucts, the antifriction bearing is one of the most scientifically and highly perfected units. Vast research toward refinement and improvement has gone and is going into the development of bearings, permitting exact knowledge as to performance and life under all speed and load conditions; the science in application, covering mountings and design, has kept pace with the peak development of all types.

Major Type is Basic Ball

More and an increasing number of special types for specific application and service are being applied; in the ball category most emanate from the single-row radial and single row angular contact design. Fundamentally, the basic ball or cylindrical-spheroid roller is the major pattern. But standard bearings for general use are being applied in greater numbers than ever before.

Since the first modern pneumatic-tired bicycles in the 90's, the rolling bearing has played an important part in transportation and through the years transportation equipment has been a leading consumer as industrial applications have increased. Many industries are now utilizing from 15 to 25 per cent more antifriction bearing mountings in new machines than was the case but 5 years ago.

Heavier and more diversified loads, higher speeds, lower power requirements and generally improved performance is possible with perfected precision and tolerance. Outstanding progress is being made in long-time lubrication and sealing, opening and broadening the field of application in numerous industries by the absence of oil and grease leaks; in textile mill equipment this is an outstanding development.

Produced to extremely close tolerances in every important dimension, exterior and interior, a common unit of measurement for ball bearings is 0.0001-inch and this is split further for some measurements. For correct fit to housing and shaft, uniform precision in exterior dimensions is essential for correct operation, accuracy and bearing-life. Attainment of controlled tolerances with better materials and improved design and engineering are major contributing factors in wider application in the metalworking and other industries.

Fatigue failure only, causes normal termination of bearing life; other causes are premature and are preventable with correct application design, mounting and maintenance. Fatigue life can be predicted closely under a given load, a certain number of revolutions or stress cycles. This is made possible by metallurgical advancements in steels, through heat-treating, machining and other production practices, also assembly, including rigidly controlled inspection and packing. Extreme uniformity in the product is the result.

To some extent the amount of friction generated in any bearing, regardless of classification, is an indication of the type and amount of internal wear that may be expected. The low operating friction or wear in the average ball bearing, if properly lubricated, is so minute it may be ignored for all practical purposes.

While power-saving due to low frictional characteristics of the angular ball bearing is a feature cited frequently, the greatest value is the fact that the starting and running friction show but slight difference; significantly small also are effects of load, speed or temperature changes upon running friction.

Bearing Carries Different Loads

Where bearings are required for a machine or mechanism, the positions are usually found to involve several or a variety of load conditions and also a range of accuracy and rigidity requirements. Selection of the type of bearing then confronts the designer; the bearing must not only carry the different loads successfully, but also meet varying demands for speed, accuracy and rigidity. This sometimes reveals the desirability of more than one on the same spindle or shaft. Background and engineering involved in the evolution of Kearney & Trecker's three-bearing spindle design for milling machines is of interest in this connection.

Kearney & Tracker Corp., Milwaukee, introduced the three-bearing spindle design in milling machines in 1930 when it announced its high speed line of model K machines to the industry.

The advent of antifriction bearings for milling machine spindles in the late 20's developed two schools of design for use of these bearings. One advocated a Timken bearing on each end of the spindle, maintaining stiffness by making the spindle large enough to carry the load.

The other school of design advocated use of two Timken bearings on each end of the spindle, spaced very closely together so that before the spindle could bend, it must first produce some distortion in the pair of bearings at each end.

Kearney & Trecker pinned faith in the first of these two practices, believing that the latter — double mounted bearings—when subjected to a temperature rise, became far too tight for satisfactory high speed operation.

However, when the matter of spindle design was considered for the new high speed K line, Kearney & Trecker engineers found they could not pursue their old line practice of maintaining stiffness simply by enlarging the spindle. It was impossible to make the new spindle large enough in diameter to match the stiffness of the new machines. To meet this situation the center-bearing spindle, Fig. 1, was devised.

Since the linear deflection of a shaft varies as the cube of the distance between its bearings, there is eight times the stiffness present with the center bearing than without that vital support. It was obvious then that with a spindle so supported, the bearings would be held square and their accuracy under load would not be impaired.

The stiffness of the spindle is further enhanced by the precision roller bearing at the spindle and opposite the spindle nose, permitting endwise movement of the spindle.

The combination of the three-bearing spindle and a carefully engineered column structure makes it impossible to spring the bearings out of line by any possible thrust transmitted by the cutter or by gear action. A stiff, rigid spindle means that more accurate work can be done. Face milling cutters remain parallel with the face of the column and produce a truer surface under all conditions. Longer tool life and generally improved machine performance too, are natural results of three-bearing spindle design, Fig. 4.

Bearings Improve Mill Facilities

Application of antifriction bearings to new machines accounts for a major share of technical improvement of textile mill facilities. The expansion and modernization program is made necessary by the heavy peacetime demand for textile products and by the gradual deterioration of outmoded machinery. Textile producers hope for a 10 to 15 per cent increase in output of looms and other processing equipment with approximately the same number of productive units and expanded use of ball and roller bearings is making this possible with

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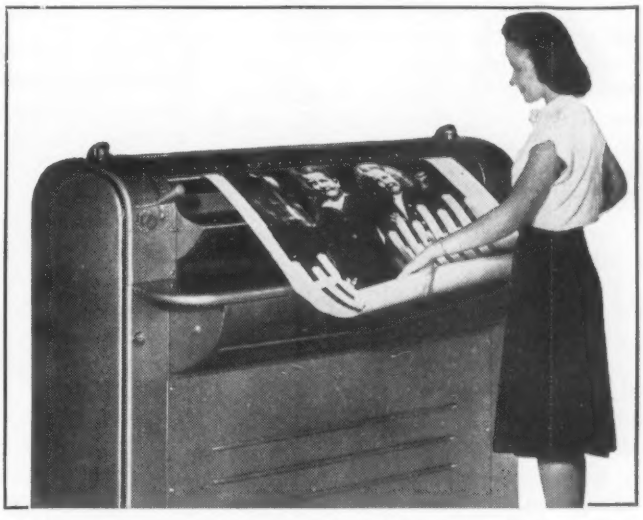

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lower costs, higher speeds and cleaner operations.

Use of precision antifriction bearings has increased 25 to 100 per cent in individual machines, looms, spinners, carders and pickers. On old machines oil leaks annually caused millions of dollars worth of damages in yards and loomed fabrics. Sealed bearings stop this spoilage and reduce power costs by as much as 15 per cent and also make hand manipulation of looms 50 per cent easier in setting up operations. Shutdowns for lubrication and bearings failures are virtually eliminated.

Other factors which are contributing to the modernization of the textile industry's machinery include increased use of automatic controls, greater streamlining to improve accessibility of parts and operation of equipment, experiments in welded steel loom frames to replace cast iron and further reduction in manual operations to increase the number of units which a single worker can control.

Major loom builders are all working toward the first significant increase in loom speeds in years. Through use of improved shuttles, complementary equipment and less friction in moving parts, peak number of picks per minute are increased from 70 to 90 a minute. A pick is one trip of the shuttle across the fabric being loomed.

Bearings designed for horizontal mounting of tape tension pulleys in textile machinery have wide application. For practically any installation where a pulley or roll must give uninterrupted service with a minimum of attention this type of ball bearing is often recommended. Included in this group are the New Departure type TP-3-500, TP-15-55 and TP-18-500, Fig. 3.

Bearings Permit High Speeds

With resulting economies to both the machine builder and operator, success of these bearings in textile service demonstrates ability to operate continuously at high speeds. Among other equipment, this type of New Departure ball bearing is installed in Saco-Lowell spinning frames Fig. 5. For more than 4 years, day and night, over a quarter of a million of these horizontal tension pulley bearings have operated in the textile industry without a single failure.

Inner ring of the bearing is extended on one side, forming a stub shaft which is furnished with a snap ring and locating groove. To retain the lubricant and excluding foreign matter which might hamper bearing performance, a solid plate seal on one side and a plate shield on the shaft extension side are included in the design, Fig. 2. A self-sealing oiler with a felt wick which filters the oil before entering the bearing is fitted to the hollow shaft; bearings are permanently lubricated at the Bristol, Conn., plant, but the addition of 15 to 20 drops of high quality machine oil once or twice a year rehabilitates the grease and increases the useful life of the bearing.

Mounting design includes a metal dust shield to prevent foreign matter from accummulating inside the pulley. For high speed operation this is important as balance must be maintained to prevent vibration and the resulting increase in power consumption. This New Departure bearing will operate in any plane up to and including vertical if the oiler is above or in horizontal plane. This streamlined mounting and design has no projecting parts to catch lint, as shown in Fig. 6.

Cam Life Doubled

Many bearings applied to textile mill machinery are of the special purpose type. One such is the New Departure treadle roll bearing which has more than doubled cam life on Draper rayon looms. This self-seal ball bearing not only reduces cam wear, but prevents sparking, eliminating fire from that cause.

For meeting practically all conditions of service, machinery designers find ball bearings originate from three basic designs, the single row radial, the single row angular contact and the double row angular contact. Most widely used as a basic type is that variously known as the nonloading groove, deep groove type or other similar names. A symmetrical unit, capable of taking both radial and thrust loads, the latter equally well from either direction, this type is used in many modified forms, including the numerous self-sealed bearings.

Most ball bearing types are made to standard dimensions of bore, width and outside diameter, and manufacturing tolerances for these dimensions are also standardized, they also limit dimensions for corner radii. Therefore ball bearings made to these standards are interchangeable, not only in quantity of a given size, but also in different makes of like type and size.

Bearings for each standard bore size are made in several different proportions or series with respect to width and outside diameter, the series range being known as extra-light, light, medium and heavy. The designer is given the choice of as many different widths, outside diameters and capacities for a given shaft where a type of ball bearing is made in all four of these series.

The designer in such a case may select four bearings, all having the same outside diameter, but with different bore sizes, permitting a choice of four shaft sizes without changing the housing diameter.

Extra-light series gives the smallest width and outside diameter for any standard size. Reduced cross section area necessitates small ball size, but the number of balls is usually greater. While the rated capacity is lower, for many applications it is sufficient, notably when considering that the increased shaft diameter reduces deflection and maintains better alignment. Also of importance in many applications is the added rigidity that can be obtained through large shaft size without increasing the housing size.

Where necessary to cover a wide range of dimension and load problems, the light and medium series bearing proportions and capacities, permit the designer additional range of choice. Beyond the medium series, the relation of bore or size shaft to bearing capacity begins to approach a point where possible shaft deflection requires even more careful mounting, spacing and location of ball bearings with respect to loads to be applied.

(To be Continued)

Behavior of Alloys in Sea Water Discussed

Tests in brackish water do not serve adequately to disclose the behavior of all compositions in full strength sea water, nor does synthetic sea water serve adequately to disclose the behavior of alloys in contact with natural sea water at high velocity. These facts were brought out in a paper by F. L. LaQue and W. C. Stewart of International Nickel Co. Inc. and U. S. Naval Engineering Experimental Station, respectively, presented before the International Congress of Corrosion on October 7 in Paris, France.

Described in the paper were three types of apparatus with which the authors studied the behavior of various alloys in contact with rapidly moving salt water. They state that it has been possible to record various factors which influence corrosion with this equipment. It has also shown that air bubbles which are harmful to some alloys have no effect and may even be beneficial to others.

When Corliss Engines were a new Power Supply . . . "STANDARD" was an old Product Supplier

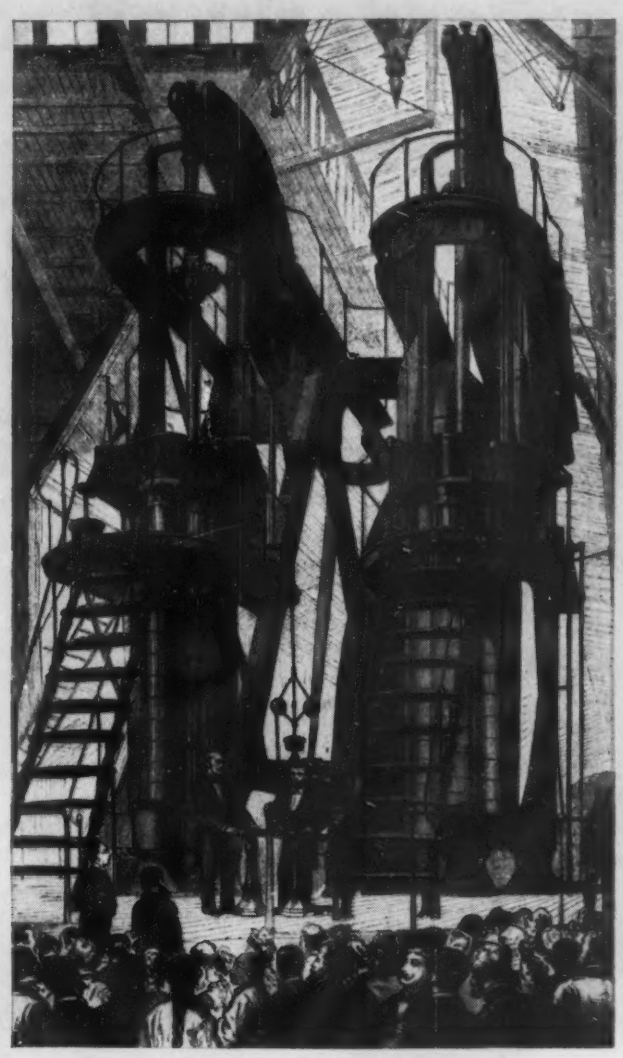


PHOTO FROM BETTMAN ARCHIVES

A high-spot in the Philadelphia Centennial in 1876 was the starting of the giant Corliss Engine by President Grant and Emperor Dom Pedro of Brazil. The mammoth size of this 1600 horse power prime mover astonished all beholders.

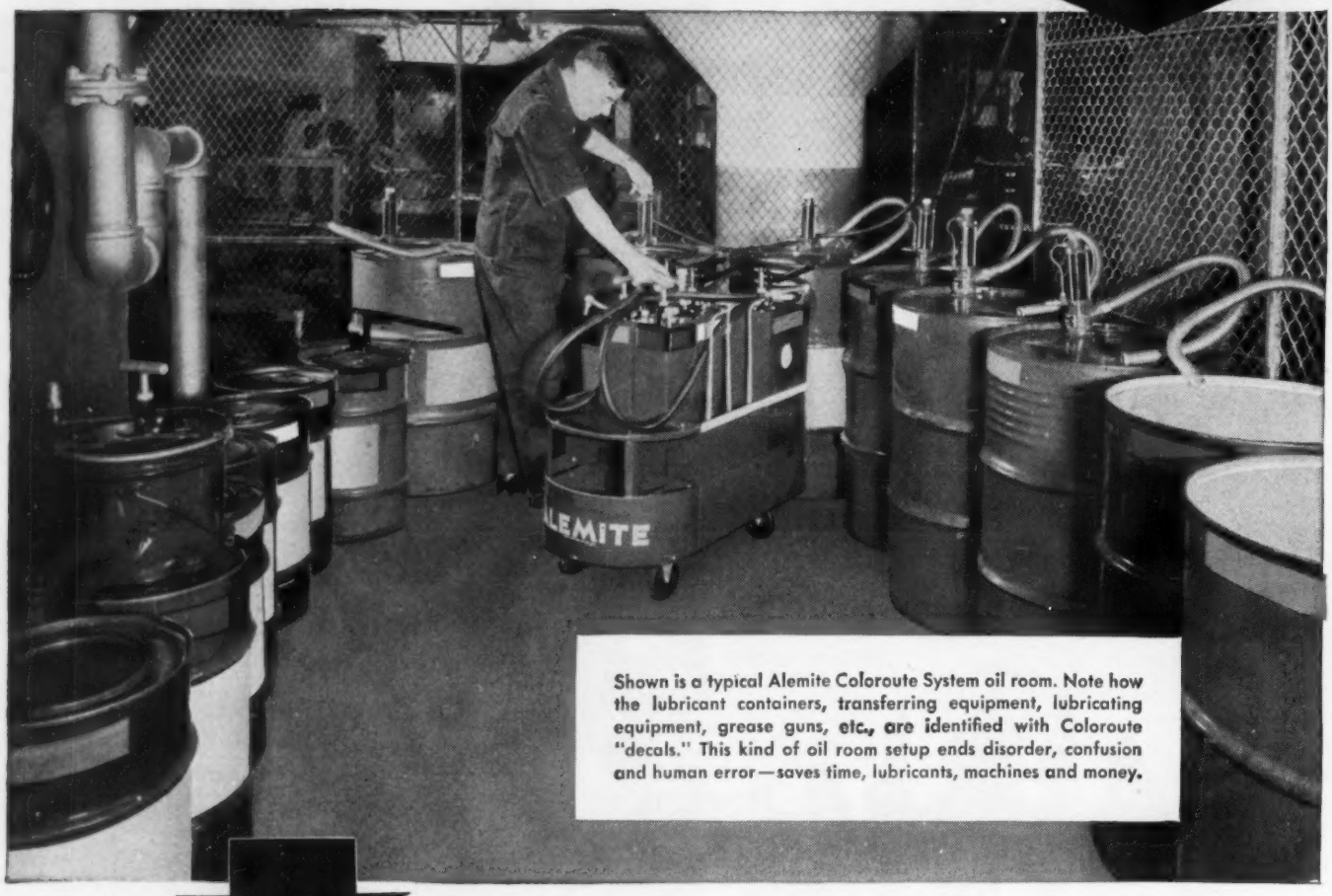
While the nation was celebrating its 100th anniversary, "Standard" was celebrating its 81st. A crucible plant with 28 four-pot melting holes, which produced over 1500 tons of steel annually, was operated. Descendants of some of the group of tire rollers, hammer men and machinists that manned the works at that time are in the employ of Standard today.

Present equipment and facilities are geared to the needs of modern industry. Open hearth furnaces permit accurate control of metal production, assuring uniform quality and properties. The steel foundry has an annual capacity of 20,000 tons of castings for all classes of service, ranging in weight from 5 up to 130,000 pounds. The forge shop produces locomotive or marine forgings, rolls, ordnance forgings, or any others of a weight not exceeding 25 tons which can be made under press or hammer. You'll find it easy to satisfy your forging and casting needs, if you "Standardize on Standard." The Baldwin Locomotive Works, Standard Steel Works Division, Burnham, Pa., U. S. A. Offices: Philadelphia, New York, Boston, Birmingham, Houston, St. Louis, Chicago, Cleveland, San Francisco, Seattle, Washington, Pittsburgh, Detroit.

BLW THE BALDWIN GROUP **BALDWIN**

FORGINGS AND CASTINGS

Good Lubrication starts with an orderly oil room like this



Shown is a typical Alemite Coloroute System oil room. Note how the lubricant containers, transferring equipment, lubricating equipment, grease guns, etc., are identified with Coloroute "decals." This kind of oil room setup ends disorder, confusion and human error—saves time, lubricants, machines and money.

YOU CAN CUT PRODUCTION COSTS BY MODERNIZING YOUR OIL ROOM

For the price of a 3 cent stamp, you can have the kind of oil room that takes all the guess work out of lubrication. You'll know for sure that the right lubricant will go where it's supposed to—that you'll have a ship-shape lubrication job down to the last machine.

Here's all you do. Make a check on your oil room right now. Then, think how much more efficient a new arrangement would be—how much an identification system would help to eliminate errors. Tell us how many types of greases and oil you use—or the number of "decals" you want. Give us the approximate number of containers, lubricating equipment, guns and other items you use.

Here's what Alemite will do. Fill in the coupon with the full information. We will then send you the Coloroute "decals" you need along with suggestions on how to design and operate an orderly oil room.

You buy nothing. This is simply Alemite's way of helping industry cut production costs through improved lubrication.

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*Name*_____

*Address*_____

*City*_____ *State*_____

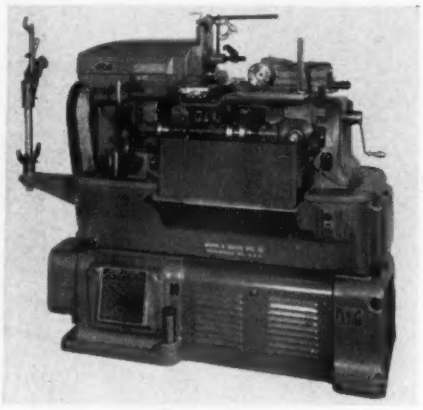
New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 144

1. Screw Machines

Increased production and efficiency on widely varying materials have been designed into the No. OOG and OG automatic screw and automatic cutting off machines, built by Brown & Sharpe Mfg. Co., Providence 1, R. I. The spindle is driven at all speeds by multiple width roller chains from the speed and ratio change gears in the base. Unit constructed spindle may be removed if necessary. Illustrated is the No. OG machine.

Spindle speeds in 196 two-speed combinations are provided in 16 groups, each group having a high



speed with which any one of 12 low speeds may be used in combination. The wide selection of ratios permits using correct threading or tapping speeds without limiting the forming, drilling or other high turning speed operations. High and low speeds may be in either direction.

Electrical controls are built in where they are protected. Overload relays with manual reset are provided. A combination magnetic starter and disconnect switch is mounted in the rear of the machine. Various safety mechanisms insure long machine life.

2. Toggle Clamp

A portable toggle clamp, designated as model 464 plier clamp by its manufacturer, Detroit Stamping Co., 359 Midland Ave., Detroit 3, Mich., is designed for sheet metal work, plastic sheet cementing or laminating and other operations necessitating quick pressure on relatively light gage materials up to ⅜-in. thick. Toggle lock action holds parts in position for drilling, riveting, welding, gluing, etc.

Clamp may also be used for template locating. Its nose is narrow for use in restricted spaces. Entire tool is forged and may be revamped for special application by welding, grinding, etc. To minimize wear, replaceable hardened steel bushings are used throughout.

3. Welder Water Saver

Turning on or shutting off the cooling water in a welding operation is accomplished by the water saver introduced for use with any type welding machine by Weltronic Co., 19508 West Eight Mile Rd., Detroit 13, Mich. It is designed so that its two control relays and the solenoid water valve are de-energized if the welding machine is stopped for a period of time longer than 30, 60 or 90 seconds.

Water saver is enclosed in a heavy sheet metal cabinet, with all component parts mounted on a control

panel easily removable for inspection. Two type 2D21 Thyratron tubes and two relays are employed in the control circuit. Power supply is 115, 280 or 460 volts, 60 cycles, single phase.

4. Tachometer

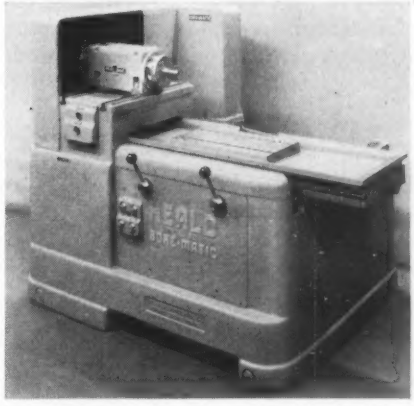
Speeds as low as 1 rpm and as high as 100,000 rpm may be measured by direct coupling with the type 53 tachometer head used in conjunction with the electric tachometer indicators, both made by Metron Instrument Co., 432 Lincoln St., Denver 9, Colo. Speed changing gear drive is built directly into the head, featuring one and two mesh spur gear construction with permanently lubricated ball bearings on all shafts. Gears are steel and self lubricating plastic. Continuous operations up to about 75,000 rpm is practical.

Direct linear speed measurements are feasible down to a fraction of a foot per minute. Head may be operated in any position. Indicator connections are made through a ½-in. conduit to inside terminals accessible by a cover plate. Dimensions are 2½ x 3⅝ x 5⅞-in.

5. Finishing Machines

Capable of both rough and finish boring, turning, facing, chamfering, grooving or fly cutting, the model 221 and 321 single and Bore-Matic finishing machines, announced by Heald Machine Co., Worcester 6, Mass., are intended for mass production of a single part requiring several operations or for single or multiple operations on more than one part simultaneously. Machines have a fast operating cycle, ample power for heavy roughing cuts, uniform hydraulic feeds, and settings which make available different rates of "in" and "out" feeds for two-way boring.

Models 221 and 321 (illustrated) are identical, except for size, the latter being larger. Width of bridge is 20 and 23⅝-inches, respectively. Maximum table travel is 15 and 20

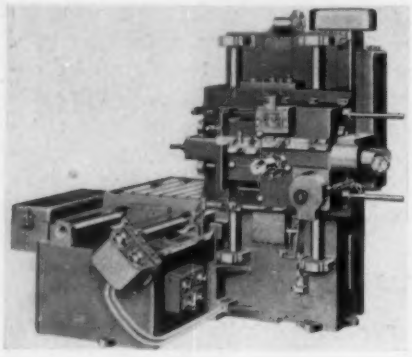


inches and width of table is 14½ and 16¾-inches. Distance from top of table to top of bridge is 6 inches in

both models. Table feeds vary with the model. Head drive motors are 3 and 5 horsepower.

6. Locator Machine

Automatic location of work in relation to a rigid, horizontal spindle for drilling, boring, reaming, tapping and allied operations is the function of the No. 20 Man-Au-Trol locator developed by Bullard Co., Bridgeport 2, Conn. The machine is composed of three basic elements: A table mounted on the machine bed and movable 20 inches longitudinally in either direction; a saddle mounted

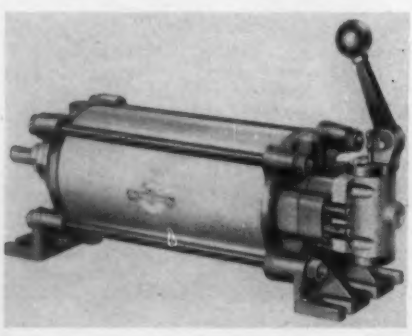


on a column and moveable 20 inches vertically; and a spindle slide mounted on the saddle and moveable 16 inches transversely.

Position stops set with integral measuring instruments automatically control the relationship between spindle and work. Once the stops are set, the operator merely dials the predetermined sequence of positions on the Man-Au-Trol control. There is a maximum potential of 400 positions where center lines of each operation fall upon common ordinates. An adjustable drive provides spindle speeds from 84 to 2020 revolutions per minute.

7. Air Motor

Heavier and more powerful, a reciprocating, nonrotating air motor embodying the integral valve design,

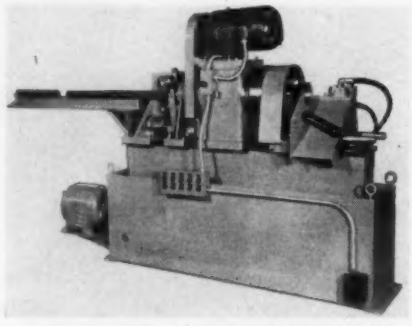


is announced by Bellows Co., 222 West Market St., Akron, O. Motor, known as BM15, has a valve operating lever which is adjustable to work from any angle in any plane. Controls which regulate piston speed in either or both directions are integral with the motor.

Only one air connection is required. With its 4½-inch bore, a piston thrust of 15 times air line pressure is developed from any given line pressure up to 175 pounds per square inch. Standard stroke lengths of 1½, 3, 6 and 9 inches are offered, with others on special order. Motors have forged steel heads, heavy brass cylinder, stainless steel piston rod and corrosion proofed piston. Various styles and mountings are available.

8. Cut-Off Machine

Accurately cut lengths of pipe and tubing are produced at high rates of production on the fully automatic cut-off machines made by Pines Engineering Co. Inc., Aurora, Ill. The work is fed by motor driven rolls through a hollow spindle and against an adjustable receding target stop. A rotating head cuts the work to required length, producing a square face and holding end-to-end dimen-



sions within a few thousandths of an inch of requirements.

Production of 1500 pieces per hour is possible, depending on composition of stock, wall thickness and diameter. Operation is continuous until stock runs out. Time to complete an entire machine cycle is 1½-seconds.

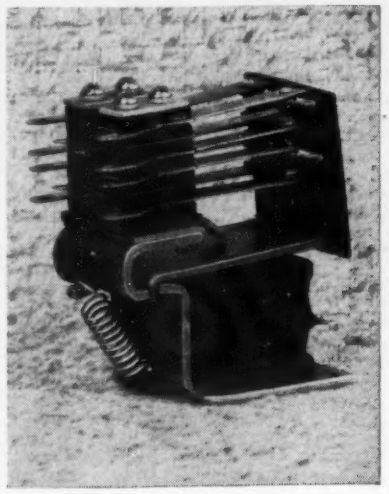
9. Conveyor-Elevator

Continuous flow of parts, packages and materials from floor to floor may be carried out with an adaption of the steel belt conveyor as an elevator, the equipment being made by Steel Parts Mfg. Corp., 226 South Morgan St., Chicago 7, Ill. Units are capable of carrying 50 pounds per baffle, which may be either flat or bucket-shaped depending upon material handled. Each baffle extends over two belt plates, lessening the strain on any one link. Baffles may be of any length; extreme lengths are dependent upon the weight of the materials to be carried.

10. Multicontact Relay

Featuring quiet operation and compactness, a new multicontact alternating current relay, designed by General Electric Co.'s Control Division, Schenectady, N. Y., for appliances and vending machines, is offered in ratings of 5 amperes, 115 volts and 5 amperes, 24 volts. This two-circuit relay occupies only 3 cubic inches. A large rocker bearing and generous contact pressure minimize effects of dust and fatigue. Many relay forms may be obtained through combinations of contacts.

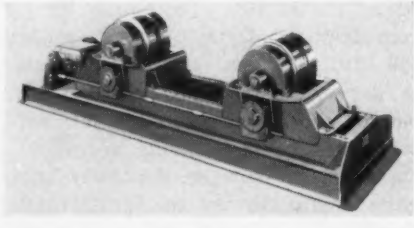
Molded phenolic insulators have stable dielectric strength and provide



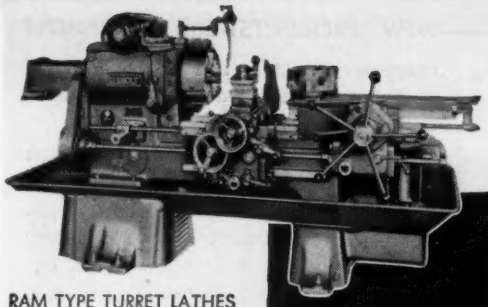
1/16-inch creepage between adjacent contact springs as well as ample insulation to ground. It mounts by any two of the four tapped holes in the base. Soldered connections may be made to coil and contact terminals.

11. Turning Roll

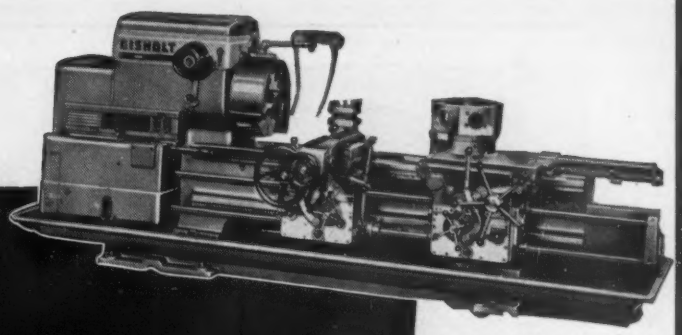
Power driven turning rolls for rotating tanks and other cylindrical shapes for either manual or automatic welding are being made in two new models of 25,000 and 50,000



pounds capacity by Reed Engineering Co., P.O. Box 415, Carthage, Mo. Designated as models 250 and 500,



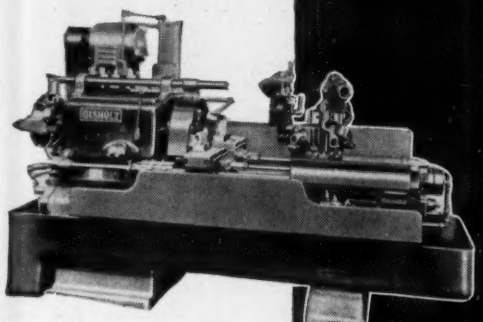
RAM TYPE TURRET LATHES



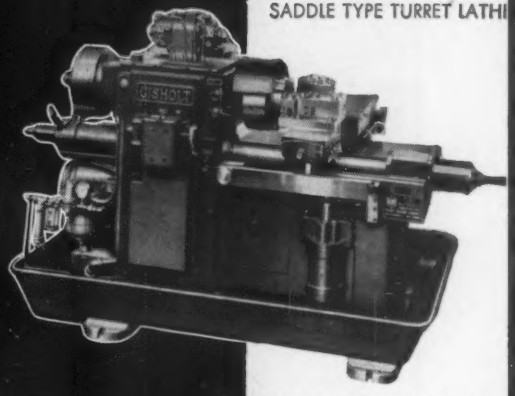
SADDLE TYPE TURRET LATHE

Which

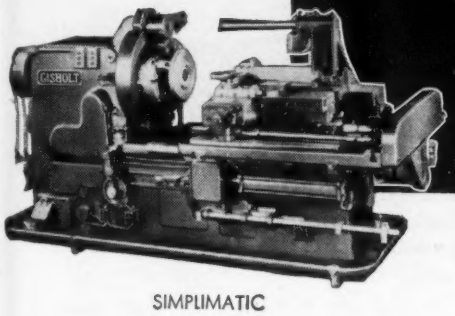
GISHOLT MACHINE for your Round Parts?



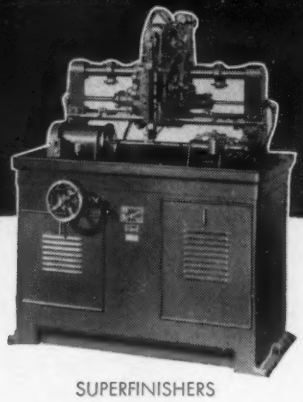
FASTERMATIC



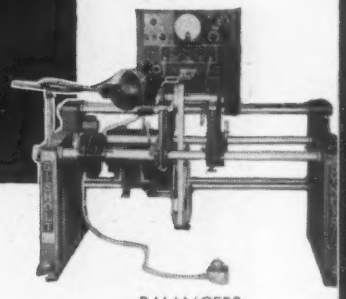
HYDRAULIC AUTOMATIC LATHE



SIMPLIMATIC



SUPERFINISHERS



BALANCERS

If you're machining—or surface finishing—or balancing parts that are round, or partly round, the chances are that Gisholt can help you cut your costs.

It doesn't matter whether your parts are big or little—whether your volumes are large or small—Gisholt offers the right size and type of machine to answer your needs.

Meet us at the GISHOLT ROUND TABLE

Here at Gisholt you will find an organization that has specialized for over a half century on the production and refinement of round and partly round parts. Here is a group of specialists who can bring more experience to bear on your particular production problems. The Gisholt Round Table is a clearinghouse for practical ideas. Make use of it.

GISHOLT MACHINE COMPANY

Madison 3, Wisconsin

THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing, and balancing of round and partly round parts. Your problems are welcomed here.

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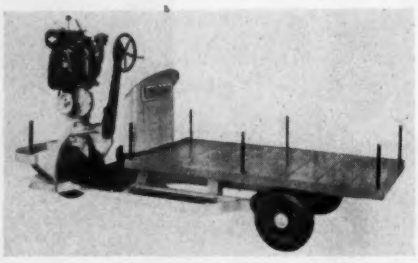
respectively, they are equipped with variable speed drive and remote control operating switch.

Both are of all-steel construction with totally enclosed gearing and have heavy duty rubber tired wheels. They are built with separate power and idler units. Where additional capacity is required, extra idler stands may be used, giving 50 per cent additional capacity to the above ratings.

12. Platform Truck

Awkward, manually loaded materials such as bagged material, pipe, bar stock, tote pans, tools and even equipment up to 1500 pounds may be handled on the platform utility truck manufactured by Truck-Man Inc., 1401 West Ganson St., Jackson, Mich. With a platform measuring 3



x 5½-feet, the truck may also be used for fire fighting equipment, greasing units or other maintenance tools.

Truck has full high and low speed in forward or reverse and is powered by a 2¼-horsepower Briggs & Stratton engine. It will turn on its own length. Specifications are: Overall length, 108 inches; wheelbase, 72 inches; ground clearance 5½-inches; loading height, 16 inches; and four 4½ x 14 inch tires.

13. Polishing Lathe

Development of extra heavy duty construction on their proper speed buffing and polishing lathe is announced by Standard Electrical Tool Co., 2504 River Rd., Cincinnati 4, O., to satisfy the increased capacity required when using semiautomatic fixtures. Power is transmitted to the

work spindle through a multiple V-belt drive. Tension is adjusted by a hand adjusting screw.

Spindle is of nickel steel, each end having Acme threads and a hard

when floor-to-floor time is measured in hours or days

make the part from *SPEED CASE* or *SPEED TREAT* Time Saver Steel

Holliday *Speed Case* and *Speed Treat* Steel Plates offer four big advantages . . . whenever parts must be machined from solid metal or large built up sections.

1. TIME SAVING—in job after job *Speed Case* and *Speed Treat* have consistently provided savings in machining time of from 25% to 40%.
2. FINE FINISH—the tooled surfaces of these steels are of such superior quality that in many instances grinding or polishing is unnecessary.
3. LONG TOOL LIFE—uniform microstructure keeps tool wear at a minimum . . . protects tools against breakage.
4. ECONOMY IN HEAT TREATING — faster carburizing properties of *Speed Case* decrease cost. Dependable response of *Speed Treat* to induction or flame hardening lowers cost and lessens hazards of conventional heat treatment.

For all the facts on Holliday *Speed Case* and *Speed Treat*, ask for your nearest representative to call.

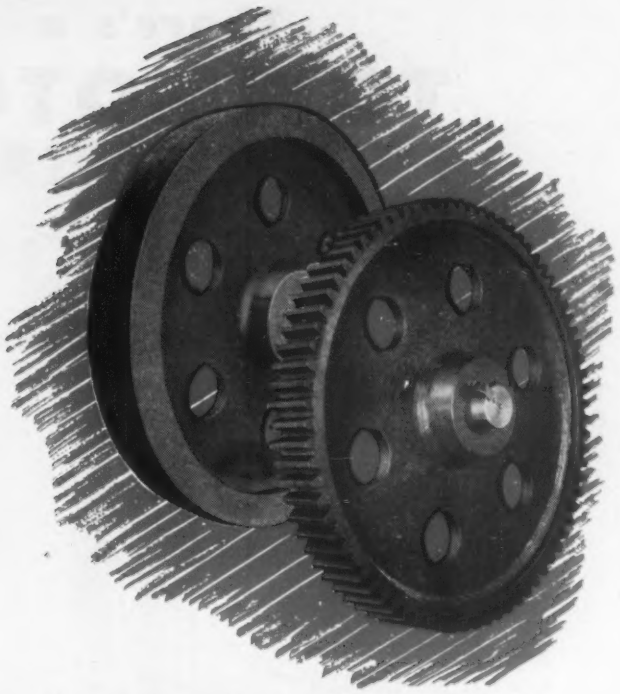
W. J. HOLLIDAY & CO., INC.

Speed Case–Speed Treat Plate Division

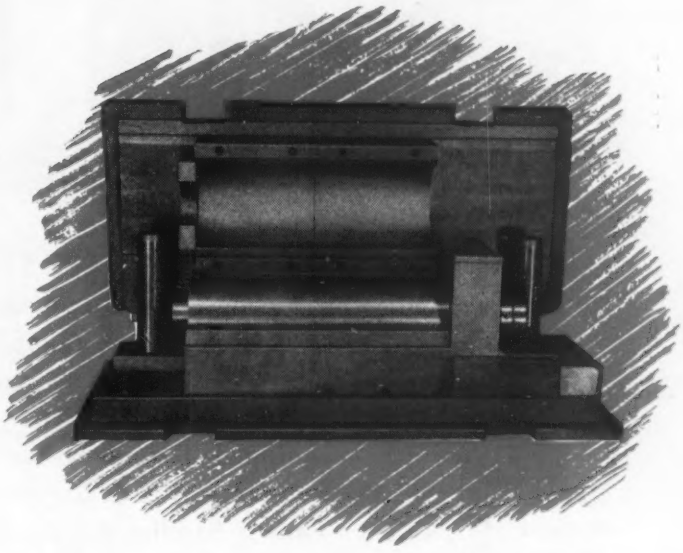
HAMMOND INDIANA

Plants: Hammond and Indianapolis, Indiana

HOLLIDAY 91 185C YEARS OF STEEL 1947



DRIVE GEAR for billet shear . . . made from *Speed Treat* plate. The web was flame cut from 1¾" plate and welded to the 53" diameter ring, flame cut from 7" plate. Fabricated gear blank and machined gear with flame hardened teeth are shown above.



PUNCH and DIE for forming 8" diameter Furnace Pipe. Use of *Speed Case* and *Speed Treat* steel in making this die-set resulted in an estimated overall cost saving of 23%. The die-set was designed and produced by the Beach Specialty Company, St. Clair Shores, Michigan.

Available in all common plate sizes from these distributors:

AKRON 1, Ohio
The Burger Iron Company
BUFFALO 5, New York
Beals, McCarthy and Rogers
BOSTON 10, Massachusetts
Brown-Wales Company
DETROIT 7, Michigan
Peninsular Steel Co.
HOUSTON 1, Texas
Earle M. Jorgensen Co.
LOS ANGELES 54, California
Earle M. Jorgensen Co.
MEMPHIS 2, Tennessee
Pidgeon-Thomas Iron Co.
NEWARK 5, New Jersey
Grammer, Dempsey & Hudson
OAKLAND 7, California
Earle M. Jorgensen Co.
PHILADELPHIA 34, Penna.
Horace T. Potts Co.
CANADA: Toronto 2, Ontario, Peckover's, Ltd.

There's a

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FORK LIFT TRUCK
and
ACCESSORY
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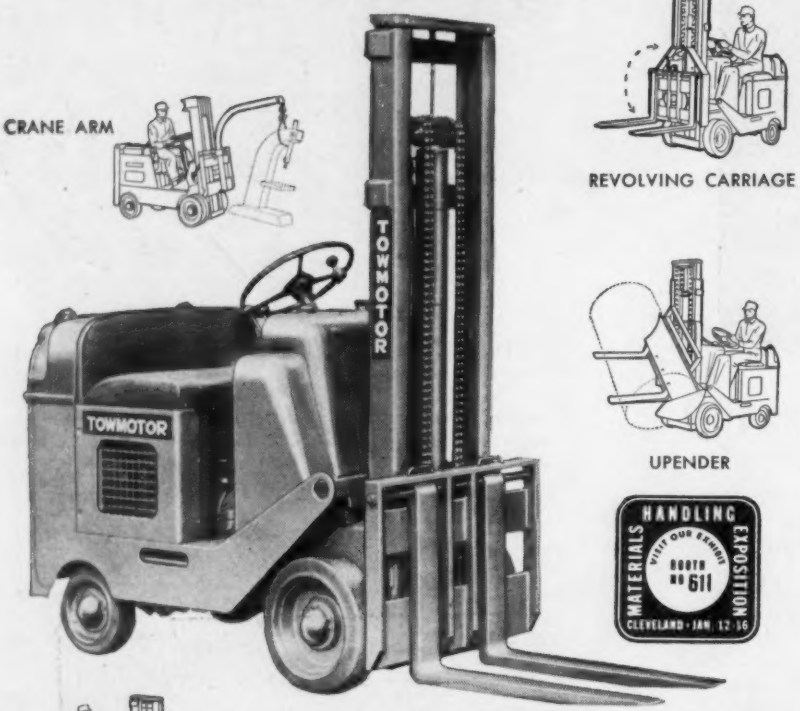

Towmotor Fork Lift Trucks provide efficient, safe and economical handling for all materials, regardless of type, shape or size. Now, to still further increase handling efficiency, the accessory equipped Towmotor can also be used for standard fork lift truck operations. Thus it handles the regular, as well as the unusual and difficult loads that are headaches in so many factories and warehouses. Let Towmotor solve your materials handling problems. Send for Towmotor Accessory Data Sheets today. Towmotor Corporation, Division 16, 1226 E. 152nd St., Cleveland 10, Ohio.

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SIDE SHIFTER • REVOLVING CARRIAGE • UNLOADER UPENDER • SCOOP • RAM CRANE ARM • EXTENSION FORKS • OVERHEAD GUARD EXTENSION BACKREST

TOWMOTOR *THE ONE-MAN-GANG* **FORK LIFT TRUCKS** *and* **TRACTORS**

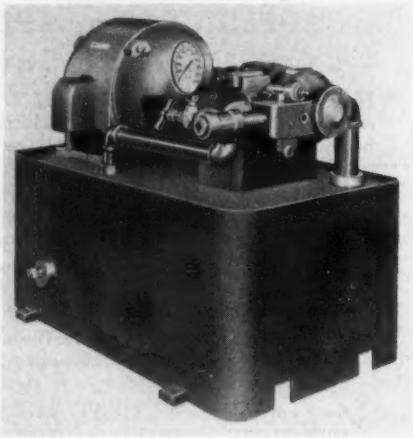
RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

bronze spindle nut. Equipment includes a shaft lock for use in changing wheels. Spindle is mounted in four ball bearings protected with labyrinth seals, oil reservoirs and sight feed oil gages. Diameter of spindle between flanges is 2 inches.

Machine illustrated is equipped with a 50 horsepower, 1800 revolutions per minute NEMA frame ball bearing motor on a hinged bed plate. Other sizes in the extra heavy duty range are 20, 25, 30 and 40 horsepower. Equipment includes magnetic starter having overload and undervoltage protection.

14. Hydraulic Power Unit

Providing for any required pump capacities from 1 gallon per minute up and for pressures to 2000 pounds per square inch or more, improved types of standardized hydraulic power units are being made by Hannifin Corp., 1101 South Kilbourn Ave., Chicago, Ill., for use with hydraulic cylinders and other hydraulically operated equipment.

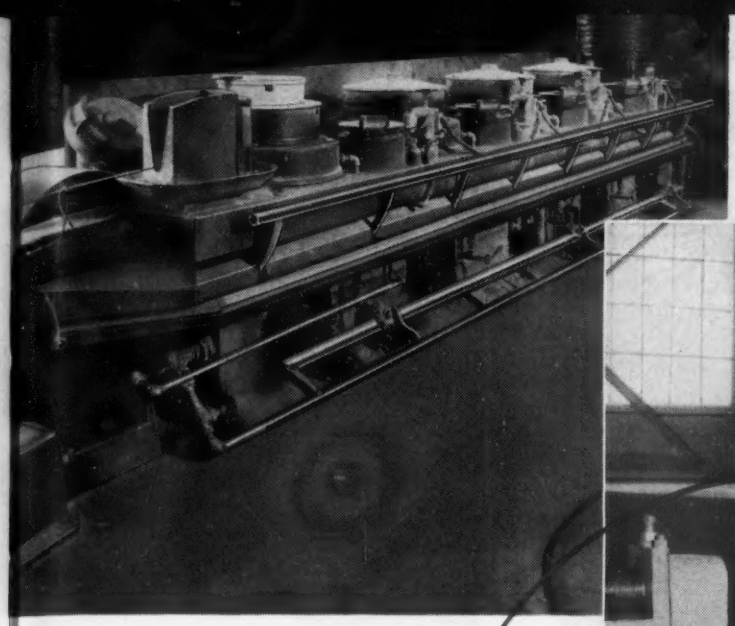


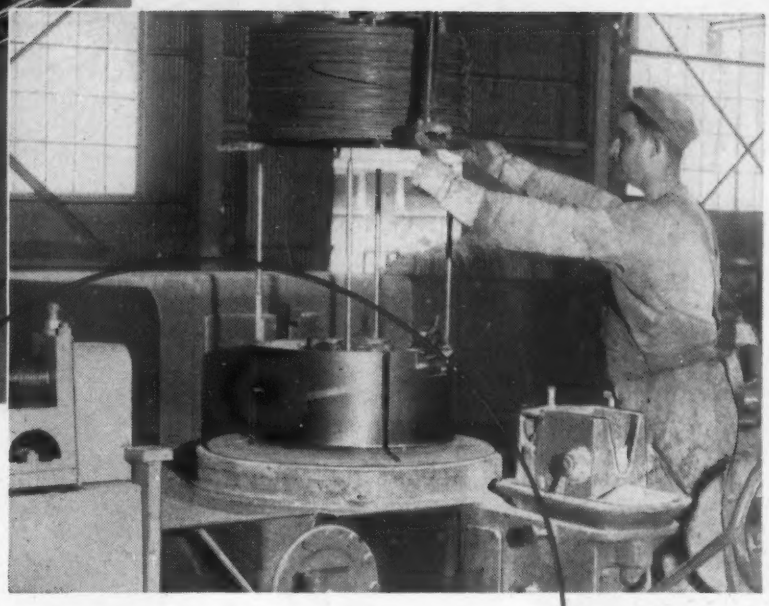
Standard equipment includes pump, pressure relief and adjusting valve, flexible pump-motor coupling and hydraulic pressure gage. Standard motors are used with the units.

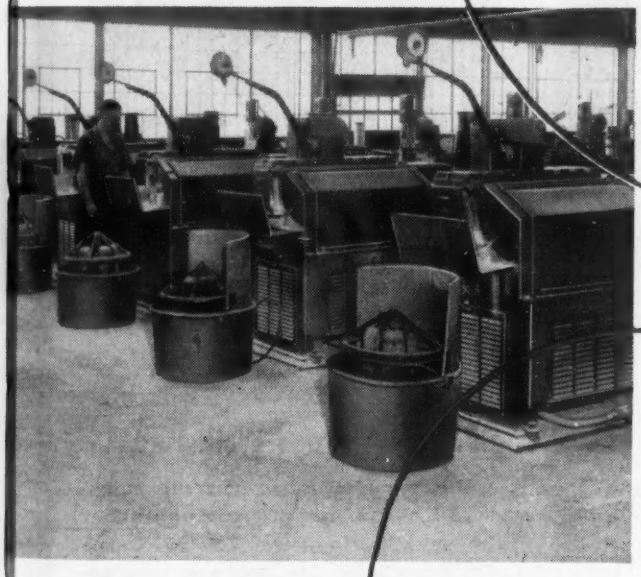
15. Gage Block Comparator

Precise comparison of external dimensions between gage blocks or master samples and gages, jigs or production parts is possible with the vertical metrological comparator manufactured by E. Leitz Inc., 304 Hudson street, New York 13. The instrument consists of a work table and comparing mechanism mounted on a common base. Determinations are made by using the comparator sight furnished with either metric or inch scales.

Metric scale is graduated in 0.001-millimeter with a range of plus or







Quick on the Draw!

Vaughn

Speed in Operation Saves Production Time

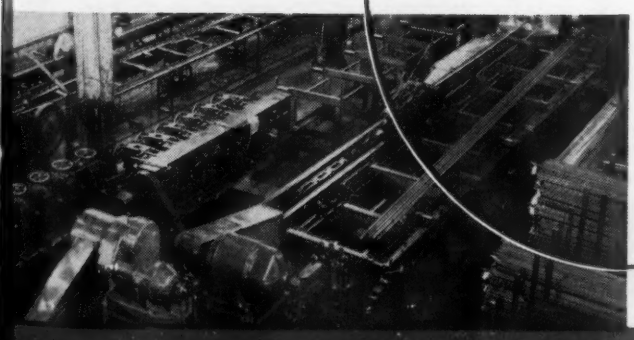
Cold Drawing Machinery

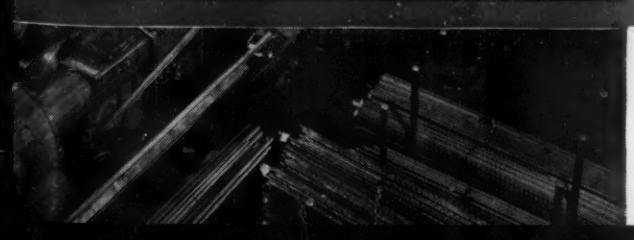
Vaughn Machinery's speed and adaptability make a significant difference in cold drawn quality and output—enable long-term reductions in operating costs. *Let us quote on your current cold drawing equipment requirements!*

THE VAUGHN MACHINERY COMPANY

CUYAHOGA FALLS, OHIO, U. S. A.

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.





VAUGHN MACHINERY

PROFITABLY USED BY LEADING PRODUCERS SINCE 1871

"MULTICUT" "TUFCUT" "HOT WORK"

Wapakoneta
SHEAR BLADES
and ROTARY KNIVES

Any type or size blade of proper Alloy with correct hardness and temper for every type shearing machine and every kind of job.

Rx ENGINEERED TO THE JOB

Every Wapakoneta blade is made to exact specifications, designed for the particular job. Complete records with order number of each blade makes possible duplication of exact size and temper at any time.

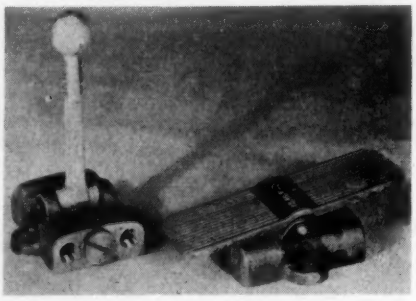
The WAPAKONETA MACHINE CO.
Shear Blade Specialists Since 1891
Wapakoneta, Ohio

minus 0.1 millimeter. Inch scale is graduated in either 0.00005 or 0.0001-inch, range of either scale being plus or minus 0.004-inch. A vernier permits reading one additional decimal place in all cases. Magnification of displacement of the contact pin is 1000 to 1.

Sight consists of an optical system wherein light is reflected through an objective lens onto a revolving mirror and then reflected back through the lens onto a screen. The comparator may also be used with a dial indicator.

16. Poppet Valve

Ross Operating Valve Co., 6486 Epworth Blvd., Detroit 10, Mich., is introducing a small poppet valve designed for operation of light machine tools, vises, fixtures, presses and other machinery adaptable to air control.

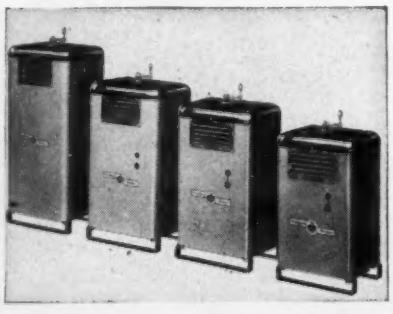


Construction is of brass and stainless steel, with a hi-carb neoprene valve seat.

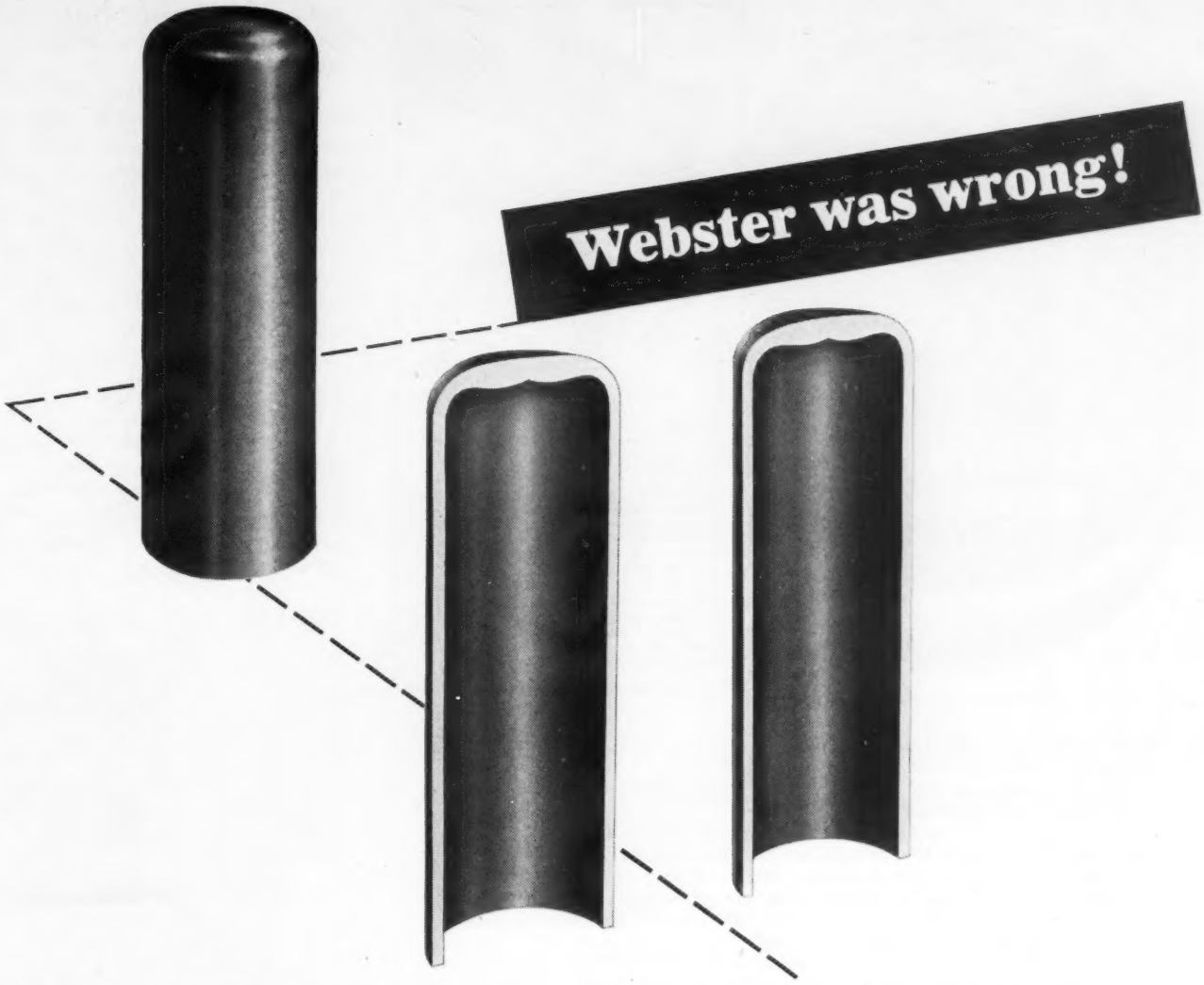
Hand lever or foot treadle is optional. Vertical lever action is suitable for small machine tool installations. Both hand and foot styles are offered in 3 and 4-way types, in non-locking, locking or neutral position types.

17. Low Voltage Welder

Flexarc alternating current industrial welders, now offered in a smaller line by Westinghouse Electric Corp., Pittsburgh 30, Pa., have a well arranged interior with reactor and transformer built around high per-



meability Hipersil steel cores. Called the 65 line, the welders have high arc



WEBSTER defined tubing as "a length or piece of tube . . . a hollow cylinder for conveying fluids, etc." But several smart production executives can provide a much better definition of tubing: "A time-saving, cost-cutting aid to more efficient production."

Of course, they're referring to OSTUCO seamless and electric-weld steel tubing, fabricated to the most intricate specifications by skilled OSTUCO craftsmen.

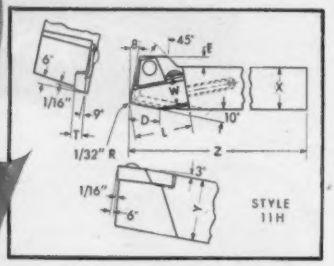
Spinning, the process illustrated, is just one of the many forming and fabricating operations OSTUCO is prepared to perform for you. This one process alone has cut production time and costs on such divergent products as dentist's drills and refrigerator compressors . . . it may be the solution to *your* production problem. An OSTUCO sales engineer will gladly show you how and why.

THE OHIO SEAMLESS TUBE COMPANY

***Plant and General Offices:* SHELBY, OHIO**

SALES OFFICES: CHICAGO, Civic Opera Bldg., 20 North Wacker Dr. CLEVELAND, 1328 Citizens' Bldg. • DETROIT, 2857 E. Grand Blvd. HOUSTON, 927 A M & M Bldg. • LOS ANGELES, Suite 200-170 So. Beverly Drive, Beverly Hills • MOLINE, 309½—16th St. • NEW YORK, 70 East 45th St. • PHILADELPHIA, 1413 Packard Bldg., 15th & Chestnut • ST. LOUIS, 1230 North Main St. • SEATTLE, 3205 Smith Tower SYRACUSE, 501 Roberts Ave. CANADIAN REPRESENTATIVE: Railway & Power Corp., Ltd., HAMILTON, MONTREAL, NORANDA, NORTH BAY, TORONTO, VANCOUVER and WINNIPEG.

IF Interrupted Cuts Are Your Problem Learn About KENNAMETAL



Style 11H is one of a complete line of Kennametal tools, having sturdy, clamped-in, advanceable Kennametal tips. This assembly — developed by Kennametal — is highly successful on interrupted cutting, and is equally outstanding on continuous-cut operations. It utilizes Kennametal's high strength to best advantage—provides a thermally-strain-free assembly; makes possible deep cuts and heavy feeds; simplifies grinding since tip is advanced and resharpened without removing any steel from shank; and enables practically all of the Kennametal tip to be utilized for cutting.

You're probably enjoying the advantages of carbide tooling on continuous-cut operations—but how about interrupted cutting?

Has this given you tool trouble, and made you resort to slower machining methods on some important jobs?

If so, Kennametal will help you solve this problem. Its ability to withstand the shock of interrupted cuts, on both cast iron and steel, has been unequalled.*

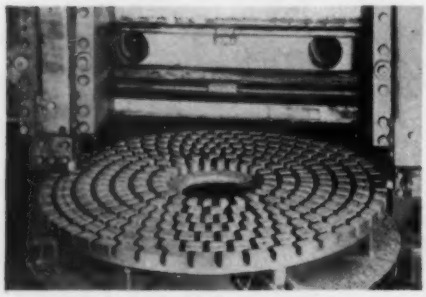
Although cutting conditions are often improved by changing the tool shape so that the shock will be imposed on a section of the tip that is stronger and better supported, it is still the carbide that must take the punishment. Here's where Kennametal has a distinct advantage.

Because of exclusive processing methods and careful control in manufacture Kennametal's impact strength is unusually high for such a hard material—as great as that of hardened alloy steels having much lower hardness and compressive strength.

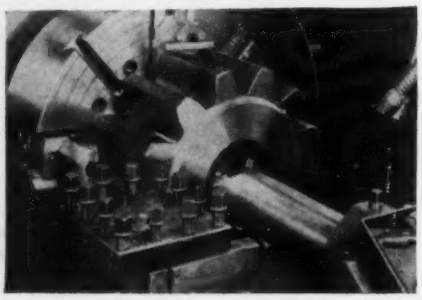
Still further advantages for interrupted cutting are obtained by the use of mechanically-held tools developed by Kennametal Inc. Tips of characteristically high impact strength are securely clamped to, and firmly supported by a heat-treated steel shank, to provide an exceptionally strong, strain-free assembly

If you have had difficulty with carbide tools on interrupted cuts, let us engineer Kennametal to the solution of your particular problem.

** Ask us to send you a set of Performance Reports that demonstrate the superior results obtained with Kennametal Tools on interrupted cutting.*



This iron casting has 288 chilled lump interruptions. A Kennametal standard Style 11T80 tool faces and turns it at 190 ft./min., .048" feed, and 1/4" depth of cut.



Kennametal bores, turns, and faces over interruptions and sand holes on this chrome-nickel steel rack pinion. Speed—155 ft./min.; feed—.032"; depth of cut—1/4" to 5/16". Performance is 5 to 1 over high speed steel tools in production and pieces per grind.

KENNAMETAL Inc.
LATROBE, PA.

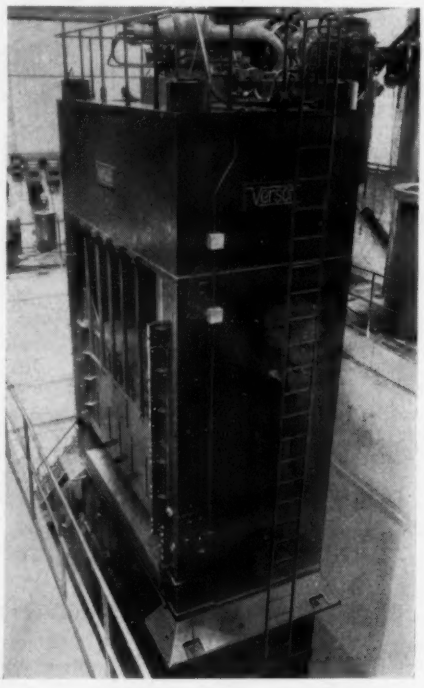
MANUFACTURERS OF SUPERIOR CEMENTED CARBIDES AND CUTTING TOOLS THAT INCREASE PRODUCTION

stability in all five current ranges—200, 300, 400, 500 and a duplex 300/600 amperes.

Built-in low voltage control assures high efficiency in low current range. Natural ventilation, movable core reactor operated by single ball crank current adjusting mechanism assure minimum maintenance and attention. To reduce overall size and maintain operating efficiency, fan cooling is employed in the 500 ampere ratings.

18. Hydraulic Press

Introduction of a 1500 ton straight side hydraulic press is made by Verson Allsteel Press Co., Chicago, Ill. Standing 38 feet high, it measures over 19 feet in length and 10 feet in width. Stroke is 48 inches with



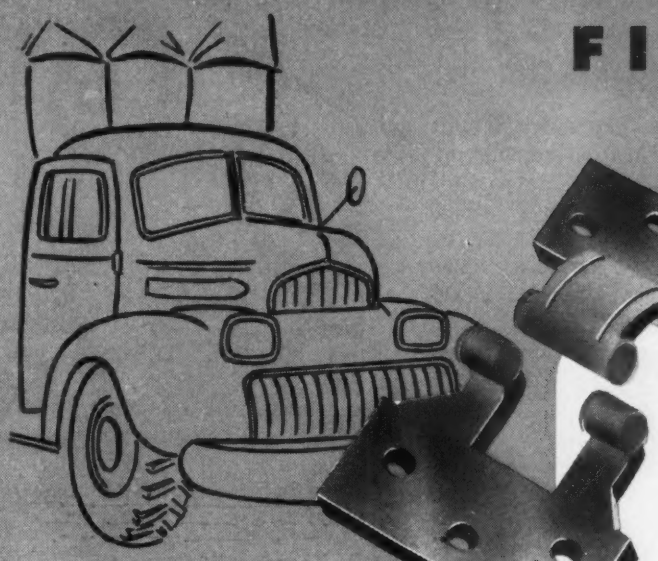
88¾-inches of daylight. Bed area is 96 x 144 inches.

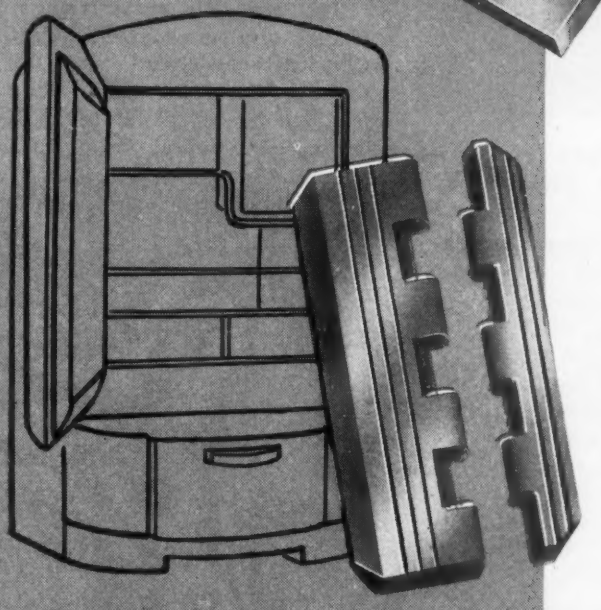
Press features fast advance to the work with automatic shift to full pressure stroke, eliminating high speed impact. Reversal is automatic on pressure or distance. Electrical pushbutton control is provided for automatic operation with control stations for four operators.

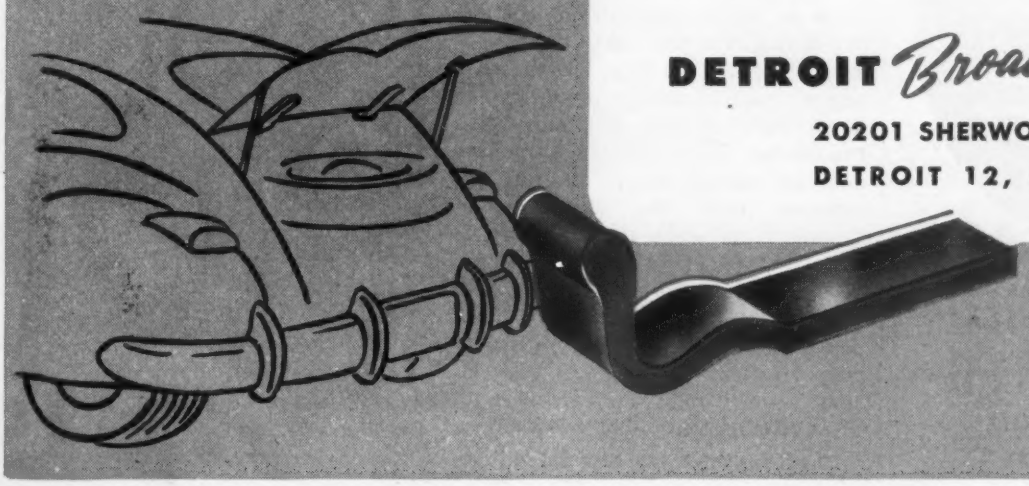
19. Swivel Clamp

Knu-Vise Inc., Detroit, announces a Jumbo clamp S-1100, which has a swivel base which permits angular clamping within 180 degrees. The base, with its integral front bracket and back support, can be turned with the mounting side positioned vertically, either front or back or at any angle in between. Mounted with

Broached HINGES FIT BETTER— Cost Less!







The section in color on each of the parts shown is broached in one operation with tooling designed and built by Detroit Broach Company. In producing close-tolerance, smooth operating hinges, broaching eliminates operations and provides many times greater production per hour.

Through broaching, these savings may be applied to high production parts of many kinds that must mate perfectly. Detroit Broach will gladly select the operations where broaching will save money on *your* parts . . . then give you complete cost and production data for each.

Write today.

DETROIT *Broach* COMPANY

20201 SHERWOOD AVENUE
DETROIT 12, MICHIGAN

face of base toward spindle, deflection at latter is only 3/16-in.

Clamp measures 16¼-in. in height and 9⅞-in. long overall. Normal hand operation can exert a pressure of 1350 lb at extreme end of bar. Spindle assembly can be moved longitudinally along the toggle bar, permitting a wide range of adjustments.

20. Fork Load Shifter

Picking up and depositing a unit load in an exact location without positioning the truck itself is possible with the new fork lift truck accessory, the Side Shifter, developed by Towmotor Corp., 1226 East 152nd St., Cleveland 10, O. Lateral move-

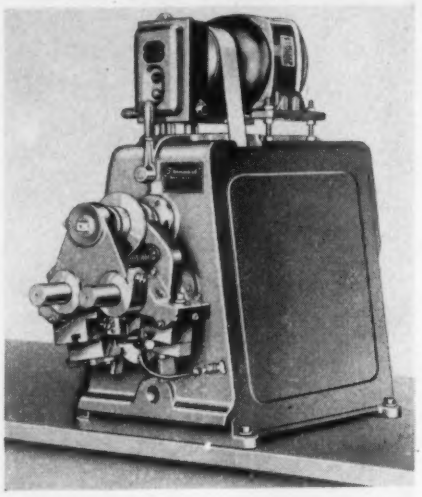
ment of a load, on forks or pallet, to either side serves to eliminate much truck maneuvering.

Hydraulically operated through a double acting cylinder controlled by a lever mounted convenient to the operator, the device will move the carriage face and forks a distance of 3½ inches in either direction. It is applicable to any industry utilizing form trucks and will operate on standard Towmotor, Priester or Schmidgall forks.

21. Screw Machine

Formation and clogging of long chips is impossible with the method of driving the feed cam shaft incorporated in the No. 2 automatic screw machine built by Standard Machinery Co., 1536 Elmwood Ave., Providence, R. I. It will accommodate all normal screw machine operations with the exception of threading on stock up to 1 inch in diameter. Other features are: Compact size, set up on 24-inch spindle centers; quick chucking and cam shaft speed-up; harmonic vibration chip breaker; and all tool settings, cam adjustments and controls at front of machine.

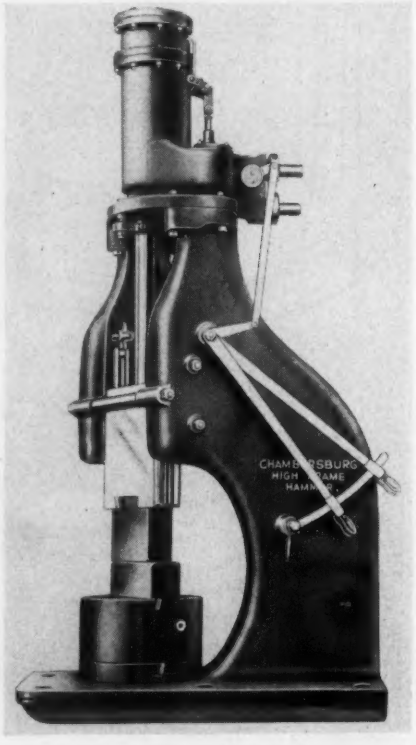
Basic machine, as illustrated, performs two operations—a roughing cut followed by a finishing tool and a cut-off. Unit is arranged for mounting on a bench. Regular equip-



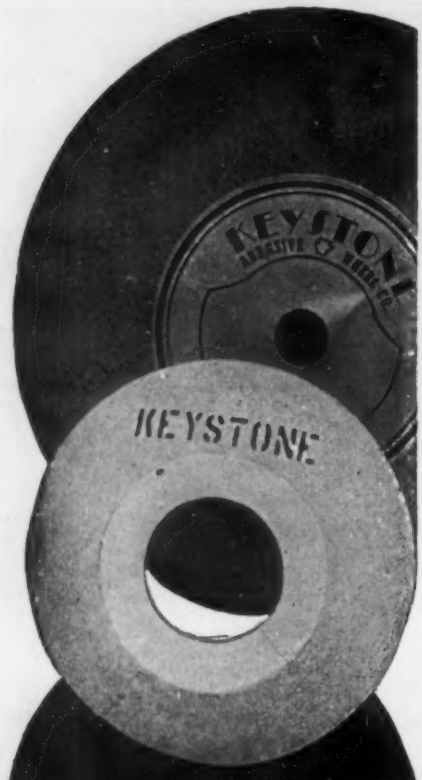
ment includes a 1½-horsepower motor with manual starter and a motor sheave arranged for a spindle speed of 900 revolutions per minute.

22. Forging Hammer

Features of the model L single high frame forging hammer, built by Chambersburg Engineering Co., Chambersburg, Pa., are: Automatically lubricated power saving cylinder with differential porting that cuts operating costs; heat treated, ground face, alloy forged steel dies which



make work manipulation easier and which will forge tougher steels with fewer redressings; induction hard-



Our engineering Service and Research Laboratory is maintained to solve your abrasive problems. Use it freely and frequently.

Let us give you the benefit of our experience in the speeding of production that can be accomplished with Keystone Wheels engineered to fit your job.

Plan a grinding session with a Keystone application engineer in the near future. He will be available at your convenience.

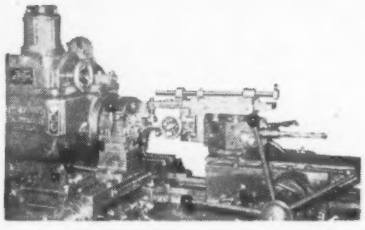
KEYSTONE
ABRASIVE WHEEL
INCORPORATED
RESINOID AND VITRIFIED
CARNEGIE, PA.

ened piston rings; self seating rotary type throttle valve directly connected to throttle control; and a heavier anvil to insure more forgings per blow.

Anvil assembly, base cap, die and keys weigh 15 times the reciprocating mass or total falling. Greater working space is provided. It is possible to forge large disks and rings, upset high stems, form arch bars, etc. with the hammer.

23. Turret Attachment

Artesan Tool & Cutter Co., 531 Vester St., Ferndale 20, Mich., is making a new model Reeve turret attachment which makes possible the



boring of tapers and profile holes with turret lathes and hand screw machines. It is necessary to set the attachment for any desired taper only —the rest being automatic.

Either tapered or straight holes may be bored without making any change in the set-up except for moving back the top slide. Size and taper at the face of the stock are held the same from piece to piece, regardless of variations in the length of the stock. Accuracy of operation reduces grinding costs. It may be mounted without interfering with other tools on the turret and is adaptable to Acme, Bullard and chucking machines.

24. Miter Gear Box

Gears which assure dependable operation for medium speed power drives or hand operation with 1:1 ratio are found in the type MG miter gear box introduced with solid mounting base to simplify installation in any position by Piezo Mfg. Corp., 110 East 42nd St., New York 17, N. Y. Steel cut gears meet power and torque rating for each respective shaft diameter in conformance with standards of AGMA. They are furnished with bronze or roller bearings, as required.

Bearings are lubricated by hydraulic type grease fittings. Oil seals prevent leakage. Shafts are keyed to the gears. Six sizes are offered with ½ to 1¾-in. shaft diameters. They may be used in operating controls of valves, doors, steering gears and other mechanical devices and power drives of transmission equipment.

25. Seam Welder

Designed for use in strip mills and in other plants where it is desired to join strip ends or skelps for long machine runs, the new 125 kilovolt

ampere double roll traveling head series seam welder, built by Federal

A Complete Warehouse Service for...
SHEETS • PLATES
STRIP • STAINLESS STEEL
TIN PLATE • BARS • SHAPES
WIRE PRODUCTS • ALLOYS
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WORLD-WIDE EXPORTERS • 620 FIFTH AVENUE, NEW YORK CITY
Tri-Boro Steel Supply Co., Inc.

Machine & Welder Co., Warren, O., makes any strip mill continuous. Machine is made in four standard sizes for welding 38, 48, 56 or 66-inch strip, either right or left handed.

Fabricated steel constructed unit has a change speed gear which gives selective speeds of 10 to 27 or 20 to 54 feet per minute. The center clamping bar, located between the weld wheels, locates the strip ends for welding in one semiautomatic operation. Its air-cooled transformer is wound for 220 volt, 60 cycle, single phase, alternating current and has 16 steps of heat regulation.

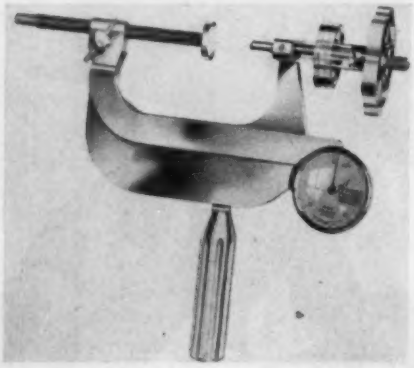
26. Utilities Racks

Produced by Palmer-Shile Co., 16025 Fullerton Ave., Detroit 27, Mich., standardized utilities racks on wheels are made in two, three and four shelf units for handling of parts or small items in course of production or assembly. They can be used at machines or for conveying materials from place to place, as they are equipped with two swivel and two rigid casters. All metal or molded-on rubber tires are offered.

Rack shelves are furnished with flanges up or down. Standard dimensions are 30 x 40 x 54 in. (width, height, length) with 12 in. between shelves on the four shelf model; 24 x 36 x 42 in. with 12 in. between shelves on three shelf model; and 20 x 32 x 19 in. on the two shelf model.

27. Hardness Tester

Rounds and flats, both hard and soft, from very thin up to 4 inches, may be tested quickly and accurately with the new model 4 portable hardness tester reading directly in Rockwell hardness scales, developed by Ames Precision Machine Works,



Waltham 54, Mass. Weighing slightly over 3 pounds, the tester frame is shaped like that of an ordinary micrometer and is sprung slightly when pressures are applied to the penetrators by turning the handwheel.

Testing of hardened steel is accomplished with a diamond penetrator, a ball penetrator being used for soft materials. Indicator dial has graduation lines which show when pressures of 60, 100 and 150 kilograms are applied. Readings are taken from graduated barrel dial located beneath a lucite magnifier.

DEVELOPED BY . . .

28. D. W. Onan & Sons Inc., Minneapolis 5, Minn., a 5000 watt electric plant weighing 272 pounds, employing an air cooled, 4-cycle, 2-cylinder gasoline engine. Several capacities for alternating and direct current are made.

29. Davis Emergency Equipment Co. Inc., 45 Halleck St., Newark 4, N. J., a gas alarm system designed to detect the presence of combustible vapor and/or gas and to give an audible signal.

30. Micro Switch, Freeport, Ill., a switch housing with a new design of rotary actuator, for protection, actuating means, conduit connection and mounting for basic switching element. Arm is adjustable through 360 degrees.

31. Bryant Heater Co., 1020 London Rd., Cleveland 10, O., a line of packaged Pow-R-Semblies, gas combustion assemblies adaptable to firing of boilers, air heaters, dryers, ovens and kilns.

32. Kennametal Inc., Latrobe, Pa., axial face Kennamill designed for production of milling of cast iron and light to medium cuts on cored or solid castings. Blades have carbide tips and are individually adjustable.

33. Wiremold Co., Hartford 10, Conn., ready-to-install prewired Plug-mold in 3 and 6 foot lengths with outlets wired in position on either 6 or 18 inch centers. Unit measures 9/16 x 13/16-inch.

34. Eastman Kodak Co., Rochester 4, N. Y., silver sensitized paper for reproducing engineering drawings on blueprint or direct process equipment. Known as Autopositive, it may be used in normal room light.

35. Parker Rustproof Co., Detroit 11, Mich., a new line of metal cleaners for steel, zinc and aluminum which includes emulsion, acid and alkaline types. Used for preparation for company's Bonderite coatings.

36. Imperial Brass Mfg. Co., Chicago 7, Ill., a heat treated duraluminum forged, heavy duty air nozzle, offered with four interchangeable noses. Operated by a button, it has a pistol grip.

37. Econotool Co., Jenkintown, Pa., a carbide tool and holder in which tool tip is held in position by a spring steel clamp, which allows stalling cut with feed engaged without shattering tip.

38. Knowles-Fisher Corp., Gowanda, N. Y., the 20th Century seatless valves which utilize two wear resistant synthetic rubber collars, one at each end of the valve.

39. Airlite Division of Aerol Co., Los Angeles 21, Calif., a line of aluminum alloy industrial wheels in sizes from 4 to 12 inches. Offered with either rubber tread or aluminum tread.

40. Hydro Chemical Co., 24 Clark St., East Hartford, Conn., 500 series of buffing compounds for ferrous and nonferrous metals. Noninflammable compound is removed by vapor or water cleaning.

41. General Scientific Equipment Co., Philadelphia 32, Pa., a diaphragm hand pump for alcohol, kerosine, motor oils, paint thinners, water and sprays. Of 15 gallons per minute (light oil) capacity, it fits into standard drum openings.

42. Lyon - Raymond Corp., 3887 Madison St., Greene, N. Y., a lightweight hydraulic foot pump providing pressures up to 1500 pounds per square inch. The 13 1/4 pound unit requires three bolt holes for mounting.

43. All-State Welding Alloys Co. Inc., White Plains, N. Y., a No. 39 flux for joining aluminum with dissimilar ferrous and nonferrous metals at low working temperatures.

44. Hanson-Van Winkle-Munning Co., Matawan, N. J., a liquid composition for coloring nickel, brass, copper, aluminum and zinc die castings. Known as Acme grade 4-L-10, it is for use with pressure type composition spray equipment.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Steel Output at Peacetime Peak, but Pinch Continues

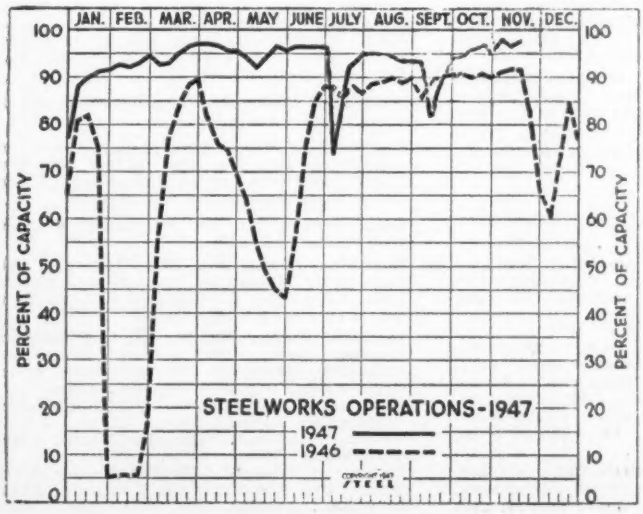
Ingot production to approach 85 million tons despite scrap and pig iron shortages. Finished steel, especially flat-rolled products, as short as ever. Harriman committee rejects plans to ship scrap to Europe; would limit semifinished exports

ALTHOUGH steel production has pushed to a peacetime peak, no easing in supplies for hard-pressed metalworking companies is yet in sight. The stringency, especially in flat-rolled products, continues as tight as at any time since the end of the war. Producers are studying their allocation records closely and some formerly on a quarterly basis have switched to a monthly basis to exercise even more strict control over distribution of their output.

October ingot output exceeded seven and a half million tons to establish a new peacetime record. Production for the first 10 months of 1947 was more than 70 million tons and if the October rate could be maintained through November and December, the year's total would be 85 million tons. Current operations are at 97 per cent of capacity, near the year's high.

Raw Materials Scarce—Last month's record is remarkable in that it was made in the face of acute shortages of the principal steelmaking raw materials, scrap and pig iron. Whether the rate can be maintained through the winter months is doubtful as the raw material supply situation is expected to deteriorate before it improves. A number of blast furnaces are being taken off or are scheduled to go down for repairs, which will restrict the supply of hot metal.

Scrap has been in critically short supply throughout the summer and adverse weather conditions are expected to intensify this condition as the winter progresses. Few mills have comfortable stocks on hand. Pricewise, scrap is quiet and awaiting a test period when the large buyers again enter the market. Hopes that a considerable amount of scrap would be realized by accelerated scrapping of war surplus material were dampened last week by the War Assets Administration which termed trade estimates of 4 million tons of potential scrap from this source as absurd.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Nov. 15	Change	Same Week 1946	Same Week 1945
Pittsburgh	102.5	+ 1	98	77
Chicago	95	+ 0.5	92.5	86.5
Eastern Pa.	93.5	None	77	78
Youngstown	91	— 1	91	75
Wheeling	93.5	+ 7.5	89	90
Cleveland	95.5	+ 5	89	83
Buffalo	88.5	None	88.5	86
Birmingham	99	None	99	95
New England	87	+ 1	90	81
Cincinnati	91	None	89	67
St. Louis	77.5	— 2.5	68	68
Detroit	92	+ 3	92	87
Estimated national rate	97	+ 1	91.5	80.5

Based on weekly steelmaking capacity of 1,749,928 net tons for 1947; 1,762,381 net tons for 1946; 1,831,636 tons for 1945.

Thumbs Down on Scrap Exports—Worries of metalworking companies and steel producers that their raw materials problems would be greatly intensified by the foreign aid program were discounted somewhat last week when the Harriman committee recommended to the President that no scrap exports be permitted, that semifinished steel shipments be pared sharply from the requests of the European nations and that other steel requirements be screened carefully. The committee revealed that this country had lost nearly 124 million tons of potential scrap through war exports from 1941-45.

Among finished steel products, sheet and strip continue the most critically short items, with pipe and plates following.

Navy Buying Plates—Eastern independent plate makers are watching advancing raw materials closely and are weighing the matter of advancing their prices. The Navy is entering the market for substantial tonnages of plates for the first time since the war.

Estimated national steelmaking rate advanced 1 point last week to 97 per cent of capacity, equalling the postwar high. Operations rose 7½ points to 93.5 per cent in Wheeling, 5 points to 95.5 per cent in Cleveland, 3 points to 92 per cent in Detroit, 1 point to 102.5 per cent in Pittsburgh, 1 point to 87 per cent in New England, and ½ point to 95 per cent in Chicago. Operations were 1 point lower at 91 per cent in Youngstown and 2½ points lower in St. Louis at 77.5 per cent. Elsewhere schedules were unchanged.

STEEL's composite price averages held unchanged last week as follows: Finished steel, $76.09; semifinished steel, $57.20; steelmaking pig iron, $36.28; and scrap, $40.42.

COMPOSITE MARKET AVERAGES

	Nov. 15	Nov. 8	Nov. 1	One Month Ago Oct., 1947	Three Months Ago Aug., 1947	One Year Ago Nov., 1946	Five Years Ago Nov., 1942
Finished Steel	$76.09	$76.09	$75.41	$75.41	$75.41	$64.45	$56.73
Semifinished Steel	57.20	57.20	56.80	56.80	56.80	40.60	36.00
Steelmaking Pig Iron	36.28	36.28	36.38	36.18	36.06	27.50	23.00
Steelmaking Scrap	40.42	40.42	40.25	39.85	39.00	22.22	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Materials

	Nov. 15, 1947	Oct., 1947	Aug., 1947	Nov., 1946
Steel bars, Pittsburgh	2.90c	2.90c	2.90c	2.50c
Steel bars, del. Philadelphia	3.318	3.301	3.28	2.86
Steel bars, Chicago	2.90	2.90	2.90	2.50
Shapes, Pittsburgh	2.80	2.80	2.80	2.35
Shapes, del. Philadelphia	2.954	2.947	2.94	2.48
Shapes, Chicago	2.80	2.80	2.80	2.35
Plates, Pittsburgh	2.95	2.95	2.95	2.50
Plates, del. Philadelphia	3.17	3.162	3.15	2.558
Plates, Chicago	2.95	2.95	2.95	2.50
Sheets, hot-rolled, Pittsburgh	2.80	2.80	2.80	2.425
Sheets, cold-rolled, Pittsburgh	3.55	3.55	3.55	3.275
Sheets, No. 10 galv., Pittsburgh	3.90	3.90	3.90	†4.05
Sheets, hot-rolled, Gary	2.80	2.80	2.80	2.425
Sheets, cold-rolled, Gary	3.55	3.55	3.55	3.275
Sheets, No. 10 galv., Gary	3.90	3.90	3.90	†4.05
Strip, hot-rolled, Pittsburgh	2.80	2.80	2.80	2.45
Strip, cold-rolled, Pittsburgh	3.55	3.55	3.55	3.05
Bright basic, bess. wire, Pittsburgh	3.675	3.675	3.675	3.05
Wire nails, Pittsburgh	4.625	4.25	4.25	3.75
Tin plate, per base box, Pittsburgh	$5.75	$5.75	$5.75	*$5.25

* Nominal. † Base, No. 24 gage.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$60.00	$60.00	$60.00	$38.00
Slabs, Pittsburgh, Chicago	47.50	47.50	47.50	39.00
Rerolling billets, Pittsburgh	47.50	47.50	47.50	39.00
Wire rod 5/16 to 1/4-inch, Pitts.	3.05c	2.925c	2.925c	‡2.30c

‡ Base, No. 5 to 5/16-in.

Pig Iron

	Nov. 15, 1947	Oct., 1947	Aug., 1947	Nov., 1946
Bessemer, del. Pittsburgh (N.&S. sides)	$37.913	$37.879	$37.83	$29.77
Basic, Valley	36.00	36.00	36.00	28.00
Basic, eastern del. Philadelphia	38.84	38.78	38.72	29.93
No. 2 fdry., del. Pgh. (N.&S. sides)	37.41	37.379	37.33	29.27
No. 2 fdry., del Philadelphia	39.34	39.28	39.22	30.43
No. 2 foundry, Chicago	36.00	36.00	36.00	28.50
No. 2 foundry, Valley	36.50	36.50	36.50	28.50
Southern No. 2, Birmingham	34.88	34.88	34.51	24.88
Southern, No. 2, del. Cincinnati	38.74	38.544	39.38	28.94
Malleable, Valley	36.50	36.50	36.50	28.50
Malleable, Chicago	36.50	36.50	36.50	28.50
Charcoal, low phos., fob Lyles, Tenn.	50.00	46.40	44.00	33.00
Ferromanganese, fob cars, Pittsburgh	151.00	151.00	140.25	140.00

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$40.00	$39.90	$39.50	$23.00
Heavy melt. steel, No. 2, E. Pa.	42.50	39.50	38.35	21.90
Heavy melt. steel, No. 1, Chicago	38.75	39.55	39.625	21.75
Heavy melt. steel, No. 1, Valley	40.00	39.50	40.50	20.00
Heavy melt. steel, No. 1, Cleveland	40.00	38.25	38.81	19.50
Heavy melt, steel, No. 1, Buffalo	42.50	39.00	40.88	19.25
Rails for rerolling, Chicago	55.50	51.00	47.125	24.25
No. 1 cast, Chicago	49.00	46.40	43.50	29.00

Coke

Connellsville, beehive furnace	$12.25	$12.15	$12.00	$8.75
Connellsville, beehive foundry	14.50	14.50	14.50	9.50
Chicago, oven foundry, del.	18.60	18.52	18.50	15.10

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $80-$85. Forging quality $46, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, $56.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $45-$50, sales by smaller interests on negotiated basis at $65 or higher.

Forging Quality Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $55-$58; Detroit, del., $61; eastern Mich., $62.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $66, del. Detroit $69, eastern Mich., $70.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Youngstown, $60; sales in open market $66 to $92.

Skelp: Pittsburgh, Youngstown, 2.60c-2.65c per lb.

Tube Rounds: Pittsburgh, Chicago, Gary, Cleveland, $69-$70.

Wire Rods: Pittsburgh, Chicago, Birmingham, 5/16 to 1/4-in., inclusive, $2.80-3.30 per 100 lb. 5/16 to 47/64-in., inclusive, $2.75, Cleveland; Galveston, $2.95; Worcester, $2.90-2.95. San Francisco (base del.), $3.52.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, base, 20 tons one size, 2.90c; Detroit, del., 3.05c; eastern Mich., 3.10c; New York, del., 3.351c; Phila., del., 3.318c; San Francisco (base, del.), 3.63-3.95c; Los Angeles (base, del.), 3.625-3.86c; Seattle, 3.55c, base.

Rail Steel Bars: Same basing points as merchant carbon bars, except base is 10 tons. Prices upon application.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.30c; Detroit, del., 3.45c; eastern Mich., 3.50c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lb., 3.55c; Detroit, del., 3.70c; Toledo, 3.75c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 4.10c; Detroit, del., 4.25c; eastern Mich., 4.30c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.75c; San Francisco (base, del.), 3.33c; Los Angeles (base, del.), 3.325c; Seattle, 3.88c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo. Prices upon application.

Iron Bars: Single refined, Pittsburgh 7.15c-†7.70c; double refined, 8.00-†9.75c; Pittsburgh, staybolt, 8.85c-†11.25c.

† Hand puddled.

Sheets

Hot-Rolled Sheets (18 gage and heavier): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Ashland, Ky., base, 2.80c; Granite City, 3.175c; Detroit, del., 2.95c; eastern Mich., del., 3.00c; Philadelphia, del., 3.02c; New York, del., 3.12c; Los Angeles (base, del.), 3.54c; San Francisco, (base, del.), 3.545c. (Andrews Steel Co. quotes Middletown, O., base for shipment to Detroit. Alan Wood Steel Co., Conshohocken, Pa., quotes 3.40c, Sparrows Point equivalent).

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.55c; Granite City, 3.65c; Detroit, del., 3.70c; eastern Mich., del., 3.75c; New York, del., 4.001c; Philadelphia, del., 3.968c.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, 3.85c-3.95c; Youngstown, Sparrows Point, Canton, Middletown, base, 3.95c; Granite City, 4.05c; New York, del., 4.27c; Philadelphia, del., 4.17c; Los Angeles (base, del.), 4.62c; San Francisco (base, del.), 4.625c.

Corrugated Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham base, 3.95c-4.05c.

Culvert Sheets, No. 16 flat: (Based on 5 cent zinc; corrugated 10 cents extra) Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.45c-4.55c; copper-iron or pure iron, 4.80c-4.90c. Granite City 4.65c and 5.00c, respectively. Los Angeles (base, del.), 5.24c; San Francisco (base, del.), 5.245c.

Aluminized Sheets: Hot-dipped, coils or cut to lengths: Pittsburgh, 7.50c.

Stainless-Clad 20%: Pittsburgh, Washington, Coatesville, Pa., No. 304, 22.00c; No. 410, 20.00c; No. 430, 20.50c; No. 446, 27.00c. Prices include annealing and pickling.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.85c-4.05c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 3.90c-3.95c; Granite City, 4.05c; Detroit, del., 4.10c; eastern Mich., 4.15c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.50c; Kokomo, Ind., 4.60c. Armature: Pittsburgh, Chicago, Gary, 4.80c; Granite City, Ill., Kokomo, Ind., 4.90c. Electrical: Pittsburgh, Chicago, Gary, 5.30c; Granite City, Kokomo, 5.40c. Motor: Pittsburgh, Chicago, Gary, 6.05c; Granite City, 6.15c. Dynamo: Pittsburgh, 6.75c; Granite City, 6.85c. Transformer 72, 7.25c; 65, 7.95c; 58, 8.65c; 52, 9.45c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.80c; Detroit, del., 2.95c; eastern Mich., del., 3.00c; San Francisco (base, del.), 3.605c; Los Angeles (base, del.), 3.60c.

Cold-Rolled Strip: 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.55c; Chicago, base, 3.65c; Detroit, del. 3.70c; eastern Mich., 3.75c; Worcester, base, 3.75c-4.10c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.55c; over 0.40 to 0.60 carbon, 5.05c, over 0.60 to 0.80, 5.65c; over 0.80 to 1.05, 7.15c; over 1.05 to 1.35, 9.45c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., 100-lb base box, $5.75; Granite City, Birmingham, Sparrows Point, $5.85.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., 100-lb base box 0.25 lb tin, $4.85; 0.50 lb tin, $5.05; 0.75 lb tin, $5.25; Granite City, Birmingham, Sparrows Point, $4.95, $5.15, $5.35, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage and lighter, 3.90c; Granite City, Birmingham, Sparrows Point, 4.00c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-lb base box $4.90; Granite City, Birmingham, Sparrows Point, $5.00.

Roofing Ternes: Pittsburgh, per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $14.10.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.95c; Coatesville, Claymont, 3.15c; Geneva, Utah, (base, del.), 3.125c; New York, del. 3.27c; Phila., del., 3.17c; St. Louis, del., 2.77c; Boston, del., 3.423c; San Francisco and Los Angeles, del., 3.67c for sizes and grades produced at Geneva, 3.76c for sizes and grades produced at Fontana, Calif.

(Central Iron & Steel Co., Harrisburg, Pa., 4.45c, basing points.)

Floor Plates: Pittsburgh, Chicago, 4.20c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.80c-4.137c; Coatesville, 4.50c.

Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 29.00c. Pittsburgh, Washington, Coatesville, Pa., 20% stainless-clad, base prices including annealing and pickling: No. 304, 24.00c; No. 410, 22.00c; No. 430, 22.50c; No. 446, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.80c; New York, del., 3.02c; Phila., del., 2.954c; Geneva, Utah (base, del.), 2.975c; Los Angeles (base, del.), 3.41c-3.47c for sizes produced at Torrance, Calif., beyond sizes at Geneva; Los Angeles and San Francisco, del., 3.52c for sizes produced at Geneva; San Francisco, del., 3.41c for sizes produced at Fontana, Calif.

Alloy Structural Shapes: Pittsburgh, Chicago, 3.55c.

Steel Piling: Pittsburgh, Chicago, Buffalo, $3.30 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

Wire to Manufacturers in carloads

Bright, basic or bessemer.....*$3.55-3.80
Spring (except Birmingham)....**$4.25-**4.50

Wire Products to Trade

Nails

Standard and cement-coated .....†$4.25-5.00
Galvanized .....‡$4.00-4.75
Staples, polished and galvanized.....$4.25-5.00
Wire, Merchant Quality
Annealed (6 to 8 base)..... §$4.20
Galvanized (6 to 8 base)..... §$4.65
(Fob Pittsburgh, Chicago, Birmingham, per base column)
Woven fence, 15 gage and heavier.... ††91-101
Barbed wire, 80-rod spool ..... ††101
Barbless wire, twisted 101
Fence Posts (no clamps)..... ††90
Bale ties, single loop ..... ††91

* Worcester, $3.65, Duluth, $3.60, base. San Francisco (base, del.), $4.56, bright basic only.

** Worcester $4.60, Duluth and Trenton, N. J., $4.75, base. San Francisco (base, del.) $5.63 for MB spring wire; $5.28 black premier.

† Worcester $4.55, Cleveland $4.35, base. San Francisco (base, del.) $5.33.

‡ Duluth $4.00, Cleveland $4.10, base. San Francisco (base, del.) $5.08.

§ Worcester $4.30, annealed; $4.75, galvanized. Duluth $4.20, annealed; $4.65, galvanized. San Francisco (base, del.) $5.21, annealed; $5.66, galvanized.

†† San Francisco (base, del.): Woven fence, 114; barbed wire, 121; bale ties, 115. Duluth (base): Woven fence, 91; barbed wire, 101; fence posts 90.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.75 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $3.10 per 100 lb; light rails (rail steel), Williamsport, Pa., Pittsburgh prices upon application.

Relaying, 60 lb and over fob warehouse $55-$56 per net ton.

Supplies: Track bolts, 7.00c; heat treated, 7.25c. Tie plates, $3.05 per 100 lb, fob mill; $3.40 base, Seattle; $3.20, base, Pittsburg, Calif. Splice bars, $3.25 per 100 lb, fob mill. Standard spikes, 4.85c; screw spikes, 6.75c. Axles, 4.10c.

Tubular Goods

Standard Steel Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

	Butt Weld				
In	Blk.	Gal.	In	Blk.	Gal.
⅛	46	19½	1	56	41½
¼	47	25	1¼	56½	42
⅜	44	22	1½	57	42½
½	50½	34½	2	57½	43
¾	53½	38½	2½ & 3	58	43½

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	49	34	48½	33½	48	33
2½-3	52	37	51½	36½	51	36
3½-6	54	39	53½	38½	53	38

Line Steel Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Butt Weld	In.	Butt Weld
⅛	45	1	55
¼	46	1¼	55½
⅜	43	1½	56
½	49½	2	56½
¾	52½	2½ & 3	57

In.	Lap Weld	Elec. Weld	Seamless
2	48	47½	47
2½ & 3	51	50½	50
3½-6	53	52½	52
8	53½	53	52½
10	53	52½	52
12	52	51½	51

Boiler Tubes: Net base prices per 100 ft, fob Pittsburgh, in carload lots, minimum wall thickness, cut lengths 4 to 24 feet, inclusive.

		——Seamless——		—Elec. Weld—	
O.D.		Hot	Cold	Hot	Cold
Sizes	B.W.G.	Rolled	Drawn	Rolled	Drawn
1"	13	....	$11.87	$11.51	$11.51
1¼"	13	....	14.06	11.48	13.64
1½"	13	$13.08	15.69	12.69	15.22
1¾"	13	14.88	17.85	14.43	17.31
2"	13	16.67	19.99	16.17	19.39
2¼"	13	18.58	22.29	18.02	21.62
2¼"	12	20.47	24.54	19.86	23.80
2½"	12	22.42	26.87	21.75	26.06
2¾"	12	23.76	28.48	23.05	27.63
3"	12	24.93	29.90	24.18	29.00
3¼"	11	29.03	34.81	28.16	33.77
3½"	11	31.17	37.39	30.23	36.27
4"	10	38.69	46.38	37.53	44.99
4½"	9	51.28	61.50	....	....
5"	9	59.39	71.18	....	....
6"	7	91.13	109.27	....	....

Pipe, Cast Iron: Class B, 6-in. and over $74.50 per net ton, Birmingham; $79.50, Burlington, N. J.; $86.12, del. Chicago; 4-in. pipe, $5 higher; class A pipe, $5 a ton over Class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	45 off
⅝ and ⅝ x 6-in. and shorter	46 off
¾-in. and larger x 6-in. and shorter	43 off
All diameters longer than 6-in.	41 off
Tire bolts	35 off
Step bolts	43 off
Plow bolts	54 off
Lag bolts	
All diameters 6 in. and shorter	46 off
All diameters longer than 6 in.	44 off

Stove Bolts

In packages, nuts separate, 65-10 off; bulk 75 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅞-in. and smaller	46 off	.....
1-in. and smaller	.....	44 off
½-in.-1-in.	44 off	.....
⅝-in.-1-in.	.....	43 off
1⅛-in.-1½-in.	42 off	41 off
1⅝-in. and larger	.....	35 off

Additional discount of 15 for full containers.

Hexagon Cap Screws (Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	53 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter	48 off
¾, ⅞, & 1 x 6 and shorter	44 off

Square Head Set Screws

Upset 1-in. and smaller	57 off
Headless, ¼-in. and larger	40 off
No. 10 and smaller	52 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural ½-in. and larger	5.65c
Lebanon, Pa.	5.80c
⅞-in. and under	55 off
Lebanon, Pa.	55 off plus 15c per cwt.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $1-$2 off

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00-17.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base, Per lb
18.00	4	1	...	82.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	67.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301	26.00c	29.50c	37.00c	22.00c	28.00c
302	26.00	29.50	37.00	23.50	30.50
303	28.50	31.50	39.00	29.50	36.00
304	27.50	31.50	39.00	25.50	32.50
308	31.50	37.00	44.50	31.00	38.00
309	39.00	43.50	51.00	40.50	51.00
310	53.50	56.50	57.50	53.00	61.00
316	43.50	48.00	52.00	43.50	52.00
321	31.50	37.00	44.50	32.00	41.50
347	36.00	41.50	49.00	36.00	45.50
431	21.00	24.00	31.50	19.00	24.50
440A	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403	23.50	27.00	32.00	23.00	29.50
410	20.50	23.50	29.00	18.50	24.00
416	21.00	24.00	29.50	20.00	25.50
420	26.00	31.00	36.50	26.00	39.50
430	21.00	24.00	31.50	19.00	24.50
430F	21.50	24.50	32.00	20.50	27.00
442	24.50	28.00	35.50	26.00	35.00
443	24.50	28.00	35.50	26.00	35.00
446	30.00	33.00	39.50	38.00	56.50
*501	9.00	13.00	17.50	13.00	18.50
*502	10.00	14.50	18.50	14.50	19.50
†STAINLESS CLAD STEEL (20%)					
304	....	24.00	22.00	....	....
410	....	22.00	20.00	....	....
430	....	22.50	20.50	....	....
446	....	29.00	27.00	....	....

* Low chromium. † Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., base	$37.00	$37.50	$38.00	$38.50
Newark, N. J., del.	39.02	39.52	40.02	40.52
Brooklyn, N. Y., del.	....	40.80	44.30	....
Philadelphia, del.	38.84	39.34	39.84	40.34
Birmingham, base	32.88*	33.38*	....	....
Baltimore, del.	....	40.42	....	....
Chicago, del.	....	36.72	....	....
Cincinnati, del.	....	38.74	....	....
Newark, N. J., del.	....	39.14	....	....
Philadelphia, del.	....	38.96	....	....
St. Louis, del.	....	37.77	....	....
Buffalo, base	36.00*	36.00*	36.50*	37.00
Boston, del.	43.128	43.128	46.63	44.13
Rochester, del.	38.02	38.02	38.52	39.02
Syracuse, del.	38.75	38.75	39.25	39.75
Canton, Massillon, O., base	35.50	36.00	36.50	....
Chicago, base	35.50	36.00	36.50	37.00
Milwaukee, del.	36.95	37.45	37.95	38.45
Muskegon, Mich., del.	....	40.21	40.71	....
Cleveland, fob furnace	35.50*	36.00*	36.50*	37.00
Akron, del.	37.34	37.84	38.34	38.84
Duluth, base	36.00	36.50	37.00	37.50
Erie, Pa., base	35.50	36.00	36.50	37.00
Everett, Mass., base	....	45.00	45.50	....
Granite City, Ill., base	36.50	37.00	....	....
St. Louis, del.	37.33	37.83	....	....
†**Neville Island, Pa.,** base	36.00	36.50	36.50	37.00
Pittsburgh, del., N.&S. Sides	36.913	37.413	37.413	37.913
Provo, Utah, base	36.00	36.50	....	....
Seattle, Tacoma, Wash., del.	....	43.03	....	....
Portland, Oreg., del.	....	43.03	....	....
Sharpsville, Pa., base	36.00	36.50	36.50	37.00
Steelton, Pa., base	37.00	37.50	38.00	38.50
Struthers, O., base	36.50	37.00	37.00	37.50
Swedeland, Pa., base	41.00	41.50	42.00	42.50
Troy, N. Y., fob furnace	39.50	....	40.00	....
Toledo, O., base	35.50	36.00	36.50	37.00
Cincinnati, del.	39.35	39.85	....	....
Youngstown, O., base	36.00	36.50	36.50	37.00
Mansfield, O., del.	39.28	39.78	39.78	40.28

† To Neville Island base add: 72.6c for McKees Rocks, Pa., $1.111 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; $1.463 Oakmont, Verona; $1.639 Brackenridge.

* Republic Steel Corp., quotes $3 a ton higher at Birmingham, effective Aug. 13; $4.00 higher for No. 2 foundry and malleable and $3.50 higher for basic at Buffalo, and $5.25 higher at Cleveland, effective on shipments during week ended Nov. 16.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent (base)....$45.50
6.51-7.00..$46.75 9.01- 9.50. 53.00
7.01-7.50.. 48.00 9.51-10.00. 54.25
7.51-8.00.. 49.25 10.01-10.50. 55.50
8.01-8.50.. 50.50 10.51-11.00. 56.75
8.51-9.00.. 51.75 11.01-11.50. 58.00

Fob Jackson, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton. **Electric Furnace Silvery Pig Iron:** Si 14.01-14.50%, $70.75, Jackson, O.; $73.75, Niagara Falls; $73, open-hearth and foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn....$50.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $36.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $42.00. Philadelphia, $44.376, delivered. Intermediate phosphorus, Central furnace, Cleveland, $39.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$12.00-$12.50
Connellsville, foundry	14.00- 15.00
New River, foundry	12.50
Wise county, foundry	11.15
Wise county, furnace	10.65

Oven Foundry Coke

Kearney, N. J., ovens	$17.85
Chicago, outside del.	17.60
Chicago, del.	18.60
Terre Haute, del.	18.15
Milwaukee, ovens	18.25
New England, del.	19.60
Birmingham, del.	15.10
Indianapolis, ovens	17.00
Cincinnati, del.	16.60
Ironton, O., ovens	15.50
Painesville, O., ovens	16.60
Cleveland, del.	18.00
Buffalo, del.	18.75
Detroit, del.	17.75
Philadelphia, ovens	16.90
Swedeland, Pa., ovens.	16.90
Portsmouth, O., ovens.	16.00
Fairmont, W. Va., ovens	15.75
Pittsburgh, del.	17.71

Coal Chemicals

Spot, cents per gallon

Pure and 90% benzol	19.00†
Toluol, two degrees	23.00
Industrial xylol	25.00*
Solvent naphtha	25.00*

Per pound fob works

Phenol (car lots, returnable drums)	12.00§
Do., less than carlots	12.75§
Do., tank cars	11.00§

Eastern plants, per pound

Naphthalene flakes, balls, bbl, to jobbers, "household use"	11.00*

Per ton, bulk, fob plants

Sulphate of ammonia	$35.00‡

* Effective Aug. 1. † Freight allowed up to 2 cents. ‡ Effective July 21. § Effective Oct. 1.

Refractories

Per 1000, fob shipping point

Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$87.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	70.00
Ala., Ga.	70.00
N. J.	75.00

Intermediate Heat Duty

Ohio	64.00
Pa., Ill., Md., Mo., Ky.	64.00
Ala., Ga.	56.00
N. J.	67.00

Low-Heat Duty

Pa., Md., Ohio	56.00

Ladle Brick

(Pa., O., Va., Mo.)

Dry Press	47.00
Wire Cut	45.00

Malleable Bung Brick

All bases	80.00

Silica Brick

Pennsylvania	70.00
Joliet, E. Chicago	79.00
Birmingham, Ala.	70.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	59.00
Chem. bonded chrome	59.00
Magnesite brick	81.00
Chem. bonded magnesite	70.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	24.00
Single bags	28.00

Dolomite

Domestic, dead-burned, bulk, net ton, fob Billmeyer, Blue Bell or Williams, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg or Woodville, O., $11.05; Midwest (fob Thornton or McCook, Ill.), add $0.10; Missouri Valley (fob Dolly Siding, and Bonne Terre, Mo.), add $0.20.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.50
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.63% contract	15.25

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos.	Nom
Swedish basic, 60 to 68%.	13.50
Spanish, No. African basic, 50 to 60%	Nom
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50-6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$30–$32

Manganese Ore

48-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 65.00c-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	28.50
50% no ratio	29.50
Brazilian—nominal	
44% to 2.5:1 lump	$33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo. cont., Mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $35; less than 60% $32.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheets, Hot-Rolled	4.30	4.30	4.30	4.30	4.30	4.30	...	...	...
Cold-Rolled	5.30	5.30	5.30	5.30	...	5.30	...	...	...
Galvanized	5.85	...	...	...	...	...	...	...	...
Strip, Hot-Rolled	4.30	4.30	4.30	4.30	...	...	...	...	...
Cold-Rolled	5.30	5.30*	5.30*	5.30	...	...	...	...	...
Shapes, structural	4.30	4.30	...	4.30	...	...	4.30	...	...
Plates	4.55	4.55	4.55	...	4.55	...	...	...	...
Bars, Small Shapes	4.45	4.45	4.45	4.45	...	4.45	...	4.45	4.45

* Nax High Tensile, produced by Great Lakes Steel Corp., quoted 10 cents higher.

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. *10G	Gal. *24G	†H-R	†C-R	H-R Rds. ⅝" to 3"	C-F Rds. ½"& up	H-R Alloy (§4140)	Structural Shapes	Carbon ⅜"-¾"	Floor ⅜" & Thicker
Boston (city)	4.96	6.03[4]	5.73[4]	6.16[4]	7.41[4]	5.04	6.73	4.95	5.63	7.22	4.82	5.11	6.79
††New York (city)	4.91	6.12	5.82[9]	6.11	7.36	5.03	....	5.02	5.57	7.00[9]	4.75	5.06	6.76
New York (country)	4.76	5.97	5.67[9]	5.96	7.21	4.88	....	4.87	....	....	4.60	4.91	6.61
Philadelphia (city)	4.67	6.28	5.88	5.87	7.12	4.78	5.68	4.83	5.53	6.95[9]	4.55	4.82	6.31
Philadelphia (country)	4.57	6.18	5.78	....	....	4.68	5.58	4.73	....	6.85[9]	4.45	4.72	6.21
Baltimore (city)	4.31†	5.91	5.61	5.71	6.96	4.76	....	4.81	5.51	....	4.68	4.76	6.26
Baltimore (country)	4.21†	5.81	5.51	5.50	6.75	4.66	....	4.71	....	....	4.58	4.66	6.16
Washington (city)	4.75	....	....	....	....	4.95	....	5.00	5.60[13]	....	4.90	4.95	6.60
Washington (country)	4.65	....	....	....	....	4.85	....	4.90	....	....	4.80	4.85	6.50
Norfolk, Va.	4.80	....	....	....	....	....	....	5.10	5.90	....	5.05	5.05	6.80
Memphis, Tenn. (city)	4.82[20]§§	5.87[20]†	....	6.37	....	5.02[20]	....	4.97[20]	5.87	....	4.97[20]	5.17[20]	6.87[20]
Memphis, Tenn. (country)	4.72[20]§§	5.77[20]†	....	6.27	....	4.92[20]	....	4.87[20]	5.77	....	4.87[20]	5.07[20]	6.77[20]
Buffalo (city)	4.45	....	5.20[6]	6.00	....	4.70	5.65	4.40	5.10	6.65	4.40	4.95	6.20
Buffalo (country)	4.30	....	5.05[6]	5.55	....	4.25	5.50	4.25	4.95	6.65	4.25	4.45	5.75
Pittsburgh (city)	4.25§§	....	5.10[8]†	5.65	6.90	4.35	5.35	4.40	5.10	6.65	4.40	4.60	5.90
Pittsburgh (country)	4.15§§	....	4.90[8]†	5.50	6.75	4.20	5.20	4.25	4.95	6.65	4.25	4.45	5.75
Cleveland (city)	4.45	5.50[8]	5.20[8]	5.79	7.04	4.52	5.35	4.40	5.10	6.93	4.65	4.60	6.15
Cleveland (country)	4.30	5.35[8]	5.05[8]	....	....	....	5.20	4.25	4.95	....	....	4.40	....
Cincinnati	4.671	5.516[8]	....	5.716	6.466	4.694	....	4.703	5.353	....	4.744	4.903	6.244
Detroit	4.55	....	5.30	....	....	4.72	5.63	4.50	5.22	7.10	4.77	4.88	6.28
Indianapolis	4.55	5.32[8]	....	5.87	7.12	4.65	5.90	4.70‡‡	5.40	8.85	4.70	4.90	6.35
Chicago (city)	4.45	5.50[8]	5.20[8]	5.65	6.90	4.35	5.45	4.40	5.10	6.65[9]	4.40	4.60	6.05
Chicago (country)	4.30	5.35[8]	5.05[8]	5.50	6.75	4.20	5.30	4.25	4.95	6.65[9]	4.25	4.45	5.90
Milwaukee	4.629	5.679[8]	5.379[8]	5.829	7.079	4.529	5.629	4.579	5.279	6.979[9]	4.579	4.779	6.229
St. Louis	4.749	5.799[9]	5.499[5]	5.974	7.224	4.649	5.774	4.699	5.424[13]	7.124	4.699	4.899	6.349
Birmingham (city)	4.45[20]§§	....	....	5.65	....	4.45[20]	....	4.40[20]	5.93[22]	....	4.40	4.65	6.86
Birmingham (country)	4.30[20]§§	....	....	5.50	....	4.30[20]	....	4.25[20]	....	....	4.25	4.50	....
New Orleans	4.98[20]**	....	6.29[18]	....	....	5.18[20]	....	5.13[20]**	6.29[11]	....	5.03[20]**	5.33[20]	7.29[20]
Omaha, Nebr.	5.365	....	....	6.565	7.815	5.265	....	5.315	6.015	....	5.315	5.515	6.965
Houston, Tex.	5.50	....	....	5.50	7.70	5.25	....	5.30	6.80[13]	7.70	5.85	5.35	6.50
San Francisco	5.20[21]	6.65[5]	....	6.85[5]	7.75[5]	5.75[21]	8.70[15]	5.05[21]	7.00[13]	9.35	5.20[21]	5.30[21]	7.10[21]
Seattle, Tacoma, Wash.	5.30[17]§§	....	7.10[5]‡	6.70	....	5.60[17]	....	5.45[17]	7.45[19]	8.50[13]	5.25[17]	5.45[17]	7.55[17]
Portland, Oreg.	5.30[17]§§	....	7.10[5]‡	6.70	....	5.60[17]	....	5.45[17]	7.45[19]	....	5.25[17]	5.45[17]	7.55[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—any quantity; [2]—300 to 1999 lb; [3]—150 to 2249 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [6]—one bundle to 1499 lb; [7]—one to nine bundles; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [10]—450 to 39,999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [13]—400 to 14,999 lb; [14]—400 to 39,999; [15]—2000 lb and over; [16]—1000 to 4999 lb; [17]—300 to 9999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § as rolled; **add 0.46 for sizes not rolled in Birmingham; †† same prices quoted for Jersey City, N. J.; ‡‡ add 15c for 100 lb for slow moving items; §§ 18 gage and heavier.

PRICES OF LEADING FERROALLOYS PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si.). Carlot per gross ton, $47, Palmerton, Pa., $51, Pittsburg. 16% to 19% Mn., $46, Palmerton, $50, Pittsburgh.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.). Carload, lump, bulk $145 per gross ton of alloy, carload packed $153, ton lot $165, less ton $172; fob New Orleans, Mobile, Philadelphia, Baltimore, or New York. Carload, lump, bulk $151, fob cars Pittsburgh, including 50c switching charge. Add, or subtract, $1.80 for each 1%, or fraction thereof, of contained manganese over 82% or under 78%.

West Coast Prices: Carload (80,000 lb or more), lump, bulk, same price and basing points as above. All other prices for shipment from Pacific Coast warehouses, add $26.21 to above prices. Delivery is fob Portland, Los Angeles, South San Francisco, or Seattle warehouses, with railroad freight allowed on shipments of 25 gross tons or more.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Eastern Zone, carload, lump, bulk, max. 0.10% C, 22.5c per lb of contained Mn, carload packed 23c, ton lot 23.6c, less ton 24.2c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Deduct 0.5c for max 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Eastern Zone, carload, lump, bulk 16.5c per lb of contained Mn, carload packed 17c, ton lot 17.6c, less ton 18.2c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Eastern Zone, carload, 2" x D, bulk 32c per lb of metal, carload packed 32.5c, ton lot 34c, less ton 36c; Central, add 1c for c.l. and 1.45c for l.c.l.; Western, add 1.45c for c.l. and 2.4c for l.c.l. Freight allowed. Spot, add 2c.

Silicomanganese: (Mn 65-70%). Eastern Zone, contract, lump, bulk, 1.50% C grade, 17-20% Si, 7.4c per lb of alloy, carload packed, 7.95c, ton lot 8.45c, less ton 8.95c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. For 2.0% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Eastern Zone, contract, c.l., lump, bulk 17.6c per lb of contained Cr, c.l., packed 18.2c, ton lot 18.8c, less ton 19.5c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Eastern Zone, contract, c.l., 8MxD, bulk 19.1c per lb of contained Cr, c.l., packed 19.7c, ton lot 20.4c, less ton 21.35c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Eastern Zone, contract, carload, lump, bulk, max. 0.03% C 27c per lb of contained Cr, 0.04% C 26c, 0.05% C 25.5c, 0.06% C 25c, 0.10% C 24.5c, 0.15% C 24.0c, 0.20% C 23.75c, 0.50% C 23.5c, 1% C 23.0c, 2% C 22.5c. Carload packed add 0.8c, ton lot add 1.35c, less ton add 2.35c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, and C 1.25% max.). Eastern Zone, contract, carload, lump, bulk 23c per lb of contained chromium, carload, packed 23.8c, ton lot 24.35c, less ton 25.35c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 2c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 2c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Eastern Zone, contract, carload, 1" x D, bulk, max. 0.50% C grade, 87c per lb of contained chromium, carload packed 88c, ton lot 89.5c, less ton 91.5c; Central, add 1.5c for c.l. and 2.5c for l.c.l.; Western, add 2.75c for c.l. and 4.5c for l.c.l. Freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 8.8c per lb of contained Si, carload packed 10c, ton lot 10.65c, less ton 11.3c; Central, add 0.5c for c.l. and 1.25c for l.c.l.; Western, add 0.7c for c.l. and 1.8c for l.c.l. Freight allowed. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.). Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 11.2c per lb of contained Si, carload packed 12.25c, ton lot 12.85c, less ton 13.45c; Central, add 0.3c for c.l. and 0.75c for l.c.l.; Western, add 1.05c for c.l. and 5c for l.c.l. Freight allowed. Spot, add 0.3c.

85% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 12.7c per lb of contained Si, carload packed 13.7c, ton lot 14.25c, less ton 14.8c; Central, add 0.3c for c.l. and 0.7c for l.c.l.; Western, add 1.05c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk, 14.35c per lb of contained Si, carload packed 15.35c, ton lot 15.85c, less ton 16.35c; Central, add 0.3c for c.l. and 0.65c for l.c.l.; Western, add 1c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.65c to above 90-95% ferrosilicon prices.

Silicon Metal: (Over 97% Si and 1% max. Fe). Eastern Zone, c.l., lump, bulk, regular, 16.5c per lb of Si, c.l. packed 17.5c, ton lot 18c, less ton 18.5c; Central, add 0.6c for c.l. and 2.25c for l.c.l.; Western, add 1.2c for c.l. and 4c for l.c.l. Add 1c for max. 0.20% calcium grade. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade, analyzing over 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract basis fob Niagara Falls, N. Y., lump per lb c.l. 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c; smaller lots, 8.65c. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Eastern Zone, contract, carload, bulk, 11.1c per lb of briquet, carload packed 11.6c, ton lot 12c, less ton 12.4c; Central, add 0.25c for c.l. and 0.9c for l.c.l.; Western, add 0.35c for c.l. and 1.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Eastern Zone, contract, carload, bulk, 8c per lb of briquet, c. l. packed, 8.6c, ton lot 9c, less ton 9.4c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si) Eastern Zone, contract, c.l., bulk 7.65c per lb of briquet, c.l. packed 8.25c, ton lot 8.65c, less ton 9.05c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Eastern Zone, contract, carload, bulk 4.65c per lb of briquet, c.l. packed 5.25c, ton lot 5.65c, less ton 6.05c. **(Small size**—weighing approx. 2½ lb and containing exactly 1 lb of Si). Eastern Zone, carload, bulk 4.8c, c.l. packed 5.4c, ton lot 5.8c, less ton 6.2c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.45c for c.l. and 0.9c for l.c.l. Freight allowed. Add 0.25c for notching, small size only. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Eastern Zone, contract, carload, lump, bulk 16.75c per lb of alloy, carload packed 17.35c, ton lot 18.85c, less ton 19.85c; Central, add 0.5c for c.l. and 0.85c for l.c.l.; Western, add 2.55c for c.l. and 2.6c for l.c.l. Freight allowed. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Eastern Zone, contract, carload, lump, bulk 15.5c per lb of alloy, carload packed 16.5c, ton lot 18c, less ton 19c; Central, add 0.5c for c.l. and 0.75c for l.c.l.; Western, add 2.55c for c.l. and 2.90c for l.c.l. Freight allowed. Spot, add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 50-55%, Si 8% max., C 3% max.). Eastern Zone, contract, any quantity, $2.90 per lb of contained Va; Central, add 2c for c.l. and 3c for l.c.l.; Western, add 6c for c.l. and 9c for l.c.l. Freight allowed. Spot, add 10c. **Special Grade** (Va 50-55%, Si 4% max., C 1% max.), $3. **High Speed Grade** (Va 50-55%, Si 1.50% max., C .20% max.), $3.10.

Vanadium Oxide: All Zones, contract, less carload lots, $1.20 per lb of contained V_2O_5. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

TITANIUM ALLOYS

Ferrotitanium: (Ti 20-25%, Al 3% max., Si 4% max., C 0.10% max.). Eastern Zone, contract, ton lot, 2" x D, $1.35 per lb of contained Ti, less ton $1.40. (Ti 40-45%, Al 7% max., Si 4% max., C 0.10% max.). Ton lot $1.23, less ton $1.25; Central, add 4c for 20-25% Ti grade, and 2.1c for 40-45% grade; Western, add 13.5c for 20-25% Ti grade, and 7.2c for 40-45% grade. Freight allowed. Spot, add 5c.

Ferrotitanium, High-Carbon: (15-20%). Contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Eastern Zone, contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Eastern Zone, contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Eastern Zone, contract, c.l., lump, bulk 6c per lb of alloy, c.l. packed 6.55c, ton lot 6.9c, less ton 7.25c; Central, add 0.25c for c.l. and 1.1c for l.c.l.; Western, add 0.6c for c.l. and 3.95c for l.c.l. Freight allowed. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Eastern Zone, contract, carload, lump, packed 18.4c per lb of alloy, ton lot 19.15c, less ton 20.4c; Central, add 0.6c for c.l. and 1.05c for l.c.l.; Western, add 3.05c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Eastern Zone, contract, ton lots, 1" x D, $1.20 per lb of alloy, freight allowed. Less ton lots $1.30; Central, add 0.75c; Western, add 2.9c, freight allowed. Spot add 5c.

Borosil: (3 to 4% B, 40 to 45% Si). $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Eastern Zone, contract, ton lot, 2" x D, $2.50 per lb of contained Cb, less ton $2.55; Central, add 1.65c; Western, add 6.45c. Freight allowed. Spot, add 10c.

CMSZ Mixes: No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Eastern Zone, carload, 12 M x D, bulk 15.75c per lb of material, carload packed 16.5c, ton lot 17.25c, less ton 18c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Eastern Zone, carload, packed, 1" x D, 37c per lb of alloy, ton lot 39c, less ton 41c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Eastern Zone, contract, carload, packed, ½" x 12 M, 14.3c per lb of alloy, ton lot 15.05c, less ton 15.8c; Central add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed. Spot, add 0.25c.

Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, smaller lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus: 17-19% based on 18% P content with unitage of $3 for each 1% of P above or below the base) Gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferromolybdenum: (55-75%). Per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Metal Miners Advocate Premium Price Plan

Extension of stockpiling plan to cover ores and concentrates also urged

NEW YORK—"If the small mine operators had any opportunity to return to a truly free competitive enterprise system, their major problems would largely disappear and no government relief or subsidies would be needed," Charles F. Willis, secretary, Arizona Small Mine Operators Association, Phoenix, Ariz., said recently. However, he stressed the need for some form of a premium price plan for metals to support the industry until normal conditions of supply and demand can be restored. He urged the mining industry to press for the early enactment of the Russell bill which would establish a national mineral policy and which he believes will go far toward providing for the wherewithal to find, develop and produce all the metals and minerals essential for national defense. He also advocated extension of the stockpiling program to cover ores and concentrates, thus making it possible for the small suppliers to sell these products to the government and providing them with an assured market for all they can produce which is impossible at the present time due to inability of many smelters to accept all custom ores offered.

Mr. Willis charged that the present graduated scale of taxation on incomes has definitely limited funds for participation of the public in new enterprises, as well as in scientific development and research. He also criticized severely the restrictions imposed on primary mine financing by the Securities & Exchange Commission and advocated a reorganization of the mining division of SEC.

Another factor of real concern to the small mines is the continued applications to the Interstate Commerce Commission by the railroads for increases in freight rates. He said that mining is the only industry having variable rates based upon value and suggested that "until the railroads can show that they will suffer a loss in performing the particular service, consideration should not be given them by any government department controlling railroad rates."

COPPER—Consumers continued to swamp sales offices of copper producers with orders for December delivery last week. Producers are distributing available supplies as equitably as possible. Part of the tightness which has developed in the market is attributed to the loss of some 15,000 tons as a result of the mine tie up in Utah during the final two weeks of October and the first week of November. Custom smelters are booked solidly for 1947.

LEAD—U. S. Commercial Co. has sold 881 short tons of lead scrap in ingot form at an average price of 16.011c, fob Howland Hook. Staten Island, N. Y. This metal had been imported from Japan. Due to continued heavy demand for December lead, at least one large seller has been forced to allocate metal to its customers.

ZINC—Domestic shipments of slab zinc increased 8118 tons in October to 58,676 tons, while production increased 3878 tons to 71,745 tons, both being the largest for any month since May. During October, 4091 tons were transferred to government stockpile, making the total so far this year 67,502 tons. Stocks at the end of October totaled 138,568 tons compared with 136,574 tons at the end of September and 220,384 tons at the end of October, 1946. Unfilled orders showed an increase of nearly 30 percent, totaling 49,361 tons at the end of October.

TIN—Shipments of Malayan tin during October totaled 2000 tons to the United States, bringing receipts for the first 10 months to 10,450 tons. Production of tin by the Longhorn smelter increased to 3014 tons in October, making the total for the first 10 months, 27,480 tons compared with 37,140 tons in the like 1946 period.

ALUMINUM—Leading smelters of remelt aluminum have raised prices on some grades ¼ to ¾-cent a pound, effective as of Nov. 6. The advance is attributed to mounting costs.

NONFERROUS METAL PRICES

Copper: Electrolytic, carlots 21.50c, delivered Conn.; Lake, 21.62½c del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c 1000-4999 lb; 1½c, 500-999 lb; 2c 0-499 lb. Casting, nom., refinery, 20,000 lb or more; nom., less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 17.50c-18.00c; 88-10-2 (No. 215) 25.75-26.25c; 80-10-10 (No. 305) 21.50-22.00c; No. 1 yellow (No. 405) 13.75-14.50c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 14.50-14.75c; No. 12 foundry alloy (No. 2 grade) 14.00-14.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 14.75c; grade 2 (92-95%) 13.00-13.25c; grade 3 (90-92%) 12.50-12.75c; grade 4 (85-90%) 12.00-12.25c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, about 20 lb), 10,000 lb and over, 20.50c; 2000 to 9999 lb, 21.50c; 100 to 1999 lb, 22.50c. Extruded rounds, 12 inches long, 1.312 inches in diameter, less than 25 lb, 52.00c-56.00c; 25 to 99 lb, 42.00c-46.00c; 100 to 4000 lb, 35.00c-36.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 80.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 79.85c; Grade C, 99.65-99.79% incl. 79.55c; Grade D, 99.50-99.64% incl., 79.40c; Grade E, 99-99.49% incl. 78.90c; Grade F, below 99% (for tin content), 78.70c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 224-999 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 35.00c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; "F" nickel shots or ingots for additions to cast iron 35.50c lb. Prices include import duty.

Mercury: Open market, spot, New York, $80-$83 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $20.50 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.65 lb for 550 lb (keg) $1.67 lb for 100 lb (case); $1.72 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y., 74.62½c, per ounce.

Platinum: $62-$65 per ounce.

Palladium: $24 per troy ounce.

Iridium: $80-$90 per troy ounce.

Rolled, Drawn, Extruded Products

Copper and brass products prices based on 21.50c, Conn., for copper. Freight prepaid on 100 lb or more).

Sheet: Copper 33.68c; yellow brass 29.63c; commercial bronze, 95% 33.72c, 90% 33.11c, red brass, 85% 31.99c, 80% 31.38c; best quality 30.64c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 38.46c; nickel silver, 18%, 42.49c; phosphor bronze, grade A, 5%, 52.00c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.39c; commercial bronze, 95% 33.41c, 90% 32.80c; red brass, 85% 31.68c, 80% 31.07c; best quality 30.33c.

Seamless Tubing: Copper 33.72c; yellow brass 32.39c; commercial bronze 90% 35.52c; red brass 85% 34.65c, 80% 34.04c; best quality brass 33.05c.

Wire: Yellow brass 29.92c; commercial bronze, 95% 34.01c, 90% 33.40c; red brass, 85% 32.28c, 80% 31.67c; best quality brass 30.93c.

Copper Wire: Bare, soft, fob eastern mills, carlots 26.92c, less carlots 27.42c; weatherproof, fob eastern mills carlots 27.60c, less carlots 28.10c; magnet, delivered, carlots 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, less carlots 30.50c-31.88c.

Aluminum Sheets and Circles: 2s and 3s flats, mill finish, base 30,000 lb or more, fob shipping point. Actual transportation charges (not to exceed lowest carload rail freight rate) are deducted on orders for domestic delivery of 500 lb or more of one product to one destination. Widths from 12 in. and diameters from 9 in. to indicated maximum sizes. Prices, cents per lb, effective Jan. 30, 1947.

B. & S. Gage	Max. Width or Diam.	Sheet Base	Circle Base
0.0249"-7	48"	23.70	26.20
8-10	48"	24.20	26.70
11-12	26"	24.70	27.50
13-14	26"	24.90	27.90
15-16	26"	25.10	28.20
17-18	26"	25.40	28.60
19-20	24"	25.70	29.00
21-22	24"	26.10	29.50
23-24	24"	26.60	30.20
25	24"	27.10	30.90
26	24"	27.80	31.90
27	24"	28.50	33.00
28	24"	29.20	33.70
29	24"	30.00	34.70
30	24"	30.80	35.80

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq ft; 75c, 10 to 20 sq ft and circles. Pipe: Full coils 17.50c; cut coils 17.75c. Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.50c; over 12-in., 14.50c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 21.00c; 5 tons and over 21.50c; 1 to 5 tons, 22.00c; less than 1 ton, 22.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 30.59c; oval, 30.09c; electrodeposited, 29.84c; cast, 29.59c.

Copper Carbonate: 52-54% metallic Cu, 50 lb bags, 26.50c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz ball, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 20.00c.

Tin Anodes: Bar, 1000 lb and over 92.50c; 500 to 1000 lb, 93.00c; 200 to 500 lb, 93.50c; less than 200 lb, 95.00c; ball, 1000 lb and over, 94.75c; 500 to 1000 lb, 95.25c; 200 to 500 lb, 95.75c; less than 200 lb, 97.25c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., price on application.

Sodium Stannate: To all consumers: in 200 or 500 lb drums, 49.50c; 100 lb, 50.50c; 50 lb, 55.00c; 25 lb, 57.50c.
To consumers other than automobile, radio and refrigerator makers: 1500 lb, 45.85c; 600 to 1400 lb, 48.50c.
To automobile, radio and refrigerator makers: 10,000 lb and over, 44.50c; 2000 to 9999 lb, 45.50c; 1000 to 1999, 46.50c; 600 to 999 lb, 48.50c.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)
Prices for less than 15,000 lb fob shipping point. Add ¾c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250
Commercial Bronze			
95%	18.000	17.750	17.250
90%	17.500	17.250	16.750
Red brass			
85%	17.250	17.000	16.500
80%	16.875	16.625	16.125
Best Quality (71-79%)	16.125	15.875	15.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A, B	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.625

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 17.50, No. 2 copper 16.50, light copper 15.50, composition red brass 13.25-13.50, auto radiators 10.50, heavy yellow brass 9.25-9.50, brass pipe 10.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 18.25, No. 2 copper 16.75-17.25, light copper, 15.75-16.25, refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 12.625-13.625.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 16.00, No. 2 15.00, light copper 14.00, No. 1 composition red brass 11.00, No. 1 composition turnings 10.00-10.50, mixed brass turnings 5.50-6.00, new brass clippings nom. 10.50-11.00, No. 1 brass rod turnings 9.00-9.50, light brass 5.00-5.50, heavy yellow brass 6.00-6.50, new brass rod ends 9.00-9.50, auto radiators, unsweated 8.50-9.00, cocks and faucets 8.00-8.25, brass pipe 8.00-8.25.

Lead: Heavy 11.50, battery plates 6.25-6.50, linotype and stereotype 12.25-12.50, electrotype 10.75-11.00, mixed babbitt 10.75-11.00, solder joints 15.50-16.00.

Zinc: Old zinc 5.00, new die cast scrap 3.50, old die cast scrap 2.00-2.50.

Tin: No. 1 pewter 50.00-52.00, block tin pipe 67.00-68.00, auto babbitt 40.00-42.00, No. 1 babbitt 40.00-43.00, siphon tops 40.00-42.00.

Aluminum clippings, 2S 8.00-8.50, old sheets 6.00-6.50, crankcases 6.00-6.50, borings and turnings 2.00-2.50, pistons, free of struts. 5.00-5.50.

Nickel: Anodes 16.00-17.00, turnings 12.50-13.00, rod ends 16.00-17.00.

Monel: Clippings 12.00-12.50, turnings 7.00-7.25, old sheets 10.00-10.50, rods 10.00-10.50, castings 9.00.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$40.00*
No. 2 Heavy Melt. Steel	40.00*
No. 1 Busheling	40.00*
Nos. 1, 2 and 3 Bundles	40.00*
Machine Shop Turnings	34.50-35.00
Mixed Borings, Turnings	34.50-35.00
Short Shovel Turnings.	36.00-37.00
Cast Iron Borings	35.00-36.00
Bar Crops and Plate	47.50-48.00
Low Phos. Steel	47.50-48.00
Elec. Furnace Bundles.	46.50-47.00
Heavy Turnings	39.50-40.50

*—Remote heavy melting scrap is coming into district on old orders at prices up to $47.

Cast Iron Grades

No. 1 Cupola	48.50-49.00
Charging Box Cast	43.00-44.00
Heavy Breakable Cast.	39.00-40.00
Unstripped Motor Blocks	44.00-45.00
Malleable	54.50-55.00
Brake Shoes	39.00-40.00
Clean Auto Cast	49.00-50.00
No. 1 Wheels	48.50-49.50

Railroad Scrap

No. 1 R.R. Heavy Melt	40.50-41.00
R.R. Malleable	55.00-56.00
Axles	49.00-50.00
Rails, Rerolling	52.00-53.00
Rails, Random Lengths	49.00-49.50
Rails, 3 ft and under	50.00-51.00
Rails, 18 in. and under	52.00-53.00
Railroad Specialties	51.00-52.00
Uncut Tires	49.00-50.00
Angles, Splice Bars	50.00-51.00

CLEVELAND

No. 1 Heavy Melt. Steel	$39.50-40.50
No. 2 Heavy Melt. Steel	39.50-40.50
No. 1 Busheling	38.70-39.50
Nos. 1 & 2 Bundles	39.50-40.50
Machine Shop Turnings	33.00-33.50
Mixed Borings, Turnings	33.00-35.00
Short Shovel Turnings.	36.00-36.50
Cast Iron Borings	36.00-36.50
Bar Crops and Plate	43.00-44.00
Punchings & Plate Scrap	43.00-44.00
Heavy Turnings	38.50-39.50
Alloy Free Turnings	37.00-38.00
Cut Structurals	48.00-50.00

Cast Iron Grades

No. 1 Cupola	53.00-55.00
Charging Box Cast	48.00-50.00
Stove Plate	50.00-52.00
Heavy Breakable Cast.	48.00
Unstripped Motor Blocks	50.00-51.00
Malleable	63.00-65.00
Brake Shoes	48.00
Clean Auto Cast	55.00-56.00
No. 1 Wheels	50.00
Burnt Cast	48.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	42.00-47.00
R.R. Malleable	63.00-65.00
Rails, Rerolling	54.00
Rails, Random Lengths	52.00-53.00
Rails, 3 ft and under	57.00-58.00
Cast Steel	50.00-52.00
Railroad Specialties	51.00-52.00
Uncut Tires	49.00-50.00
Angles, Splice Bars	53.00-54.00

VALLEY

No. 1 Heavy Melt. Steel	$40.00*
No. 2 Heavy Melt. Steel	40.00*
No. 1 Bundles	40.00*
Machine Shop Turnings	34.00-35.00
Short Shovel Turnings.	36.50-37.00
Cast Iron Borings	35.50-36.00
Low Phos.	48.00-49.00

* Plus freight.

Railroad Scrap

No. 1 R.R. Heavy Melt.	42.00-47.50

MANSFIELD

Machine Shop Turnings	36.50-37.50
Short Shovel Turnings.	36.50-37.50

CINCINNATI

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
No. 1 Bundles	39.50
No. 2 Bundles	39.50
Machine Shop Turnings	33.50
Mixed Borings, Turnings	32.50
Short Shovel Turnings.	35.50
Cast Iron Borings	34.50

Cast Iron Grades

No. 1 Cupola Cast	48.00
Charging Box Cast	40.00
Heavy Breakable Cast.	42.00
Stove Plate	40.00
Unstripped Motor Blocks	39.00
Brake Shoes	36.00
Clean Auto Cast	47.00
Drop Broken Cast	50.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	42.00
R.R. Malleable	58.00
Rails, Rerolling	48.50
Rails, Random Lengths	46.50
Rails, 18 in. and under	51.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$34.50-35.00
No. 1 Busheling	34.50-35.00
Nos. 1 & 2 Bundles	34.50-35.00
No. 3 Bundles	34.50-35.00
Machine Shop Turnings	28.50-29.00
Mixed Borings, Turnings	28.50-29.00
Short Shovel Turnings.	29.50-30.00
Cast Iron Berings	29.50-30.00
Punchings & Plate Scrap	40.00-41.00

Cast Iron Grades

No. 1 Cupola Cast	45.00-46.00
Heavy Breakable Cast.	38.00-39.00
Clean Auto Cast	45.00-46.00

BUFFALO

No. 1 Heavy Melt. Steel	$41.50-43.50
No. 2 Heavy Melt. Steel	39.50-40.50
No. 1 Busheling	39.50-40.50
No. 1 & 2 Bundles	39.50-40.50
Machine Shop Turnings	34.00-34.50
Mixed Borings, Turnings	34.00-34.50
Cast Iron Borings	34.00-34.50
Short Shovel Turnings.	36.00-36.50
Los Phos.	45.00-47.00
Elec. Furnace Bundles.	44.00-45.00

Cast Iron Grades

No. 1 Cupola	45.00-47.00
Heavy Breakable Cast.	41.00-42.00
Malleable	60.00-62.00
No. 1 Wheels	50.00-52.00

Railroad Scrap

Rails, 3 ft. and under	50.00-52.00
Railroad Specialties	49.00-51.50

PHILADELPHIA

No. 1 Heavy Melt. Steel	$42.00-43.00
No. 2 Heavy Melt. Steel	42.00-43.00
No. 1 Busheling	42.00-43.00
No. 1, No. 2 Bundles	42.00-43.00
No. 3 Bundles	40.00-41.00
Machine Shop Turnings	33.50-34.00
Mixed Borings, Turnings	33.50-34.00
Short Shovel Turnings.	35.00
Bar Crop and Plate	47.50-48.50
Punchings & Plate Scrap	47.50-48.50
Cut Structurals	47.50-48.50
Elec. Furnace Bundles.	44.50-45.50
Heavy Turnings	43.00-44.00
No. 1 Chemical Borings	39.00-40.00

Cast Iron Grades

No. 1 Cupola Cast	50.00-51.00
No. 1 Machinery Cast.	52.00-54.00
Charging Box Cast	49.00
Heavy Breakable Cast.	49.00
Unstripped Motor Blocks	46.00-47.00
Malleable	58.00-60.00
Clean Auto Cast	52.00-54.00
No. 1 Wheels	50.00-51.00

NEW YORK

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$39.00
No. 2 Heavy Melt. Steel	39.00
No. 1 Busheling	39.00
Nos. 1 & 2 Bundles	39.00
No. 3 Bundles	37.00
Machine Shop Turnings	29.00-30.00
Mixed Borings, Turnings	29.00-30.00
Short Shovel Turnings.	31.00-32.00
Punchings & Plate Scrap	40.00
Cut Structurals	40.00
Elec. Furnace Bundles.	40.00

Cast Iron Grades

No. 1 Cupola Cast	43.00-44.00
Charging Box Cast	43.00-44.00
Heavy Breakable	43.00-44.00
Unstripped Motor Blocks	40.00-42.00
Malleable	54.00-55.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$31.00-32.00
No. 2 Heavy Melt. Steel	29.00-30.00
No. 1 Bundles	30.00-31.00
No. 1 Busheling	29.00-30.00
Machine Shop Turnings	26.00-27.00
Mixed Borings, Turnings	27.00-28.00
Short Shovel Turnings.	27.00-28.00
Bar Crops and Plate	32.00-33.00
Punchings & Plate Scrap	32.00-33.00
Chemical Borings	28.00-29.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-44.00
Charging Box Cast	38.00-39.00
Heavy Breakable Cast.	38.00-39.00
Stove Plate	38.00-39.00
Unstripped Motor Blocks	36.00-37.00
Clean Auto Cast	40.00-42.00

CHICAGO

No. 1 Heavy Melt. Steel	$38.50-39.00
No. 2 Heavy Melt. Steel	38.50-39.00
Nos. 1 & 2 Bundles	38.50-39.00
No. 3 Bundles	36.50-37.00
Machine Shop Turnings	33.50-34.00
Mixed Borings, Turnings	33.50-34.00
Short Shovel Turnings.	35.50-36.00
Cast Iron Borings	34.50-35.00
Bar Crops and Plate	41.00-41.50
Punchings	44.50-45.00
Elec. Furnace Bundles.	39.50-40.00
Heavy Turnings	38.00-38.50
Cut Structurals	43.50-44.00

Cast Iron Grades

No. 1 Cupola Cast	48.00-50.00
Clean Auto Cast	48.00-50.00
No. 1 Wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	44.50-45.00
Malleable	66.00-67.00
Rails, Rerolling	56.00-57.00
Rails, Random Lengths	51.00-52.00
Rails, 3 ft and under	52.00-53.00
Rails, 18 in. and under	54.00-55.00
Railroad Specialties	52.00-53.00
Angles, Splice Bars	51.00-52.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$39.00-40.00
No. 2 Heavy Melt. Steel	37.00-38.00
Machine Shop Turnings	29.00-31.00
Short Shovel Turnings.	33.00-34.00

Cast Iron Grades
(Fob shipping point)

No. 1 Cupola Cast	45.00-47.00
Charging Box Cast	40.00-41.00
Heavy Breakable Cast.	37.00-38.00
Brake Shoes	40.00-41.00
Clean Auto Cast	45.00-47.00
Burnt Cast	40.00-41.00

Railroad Scrap

R.R. Malleable	58.00-60.00
Rails, Rerolling	50.00-53.00
Rails, Random Lengths	45.00-47.00
Rails, 3 ft and under	48.00-50.00
Uncut Tires	43.50-44.50
Angles, Splice Bars	47.00-48.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$34.00-35.00
No. 2 Heavy Melt. Steel	34.00-35.00
No. 1 Busheling	34.00-35.00
Nos. 1 & 2 Bundles	34.00-35.00
No. 3 Bundles	31.00
Long Turnings	24.50
Short Shovel Turnings.	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	38.50
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	41.00
Stove Plate	39.00
No. 1 Wheels	36.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	37.00
R.R. Malleable	42.50
Axles, Steel	39.00
Rails, Rerolling	41.00
Rails, Random Length.	39.00
Rails, 3 ft and under	41.00
Angles and Splice Bars	41.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$25.00
No. 2 Heavy Melt. Steel	*25.00
No. 1 Busheling	*25.00
Nos. 1 & 2 Bundles	*25.00
No. 3 Bundles	*20.00
Machine Shop Turnings	*15.50
Bar Crops and Plate	25.00
Cast Steel	25.00
Alloy Free Turnings	15.50
Cut Structurals	25.00
Tin Can Bundles	20.00

Railroad Scrap

No. 1 Heavy Melting	26.00
Axles	32.00
Rails, Random Lengths	26.50
Uncut Tires	33.50

*Fob California shipping point

SEATTLE

No. 1 Heavy Melt. Steel	$24.00
No. 2 Heavy Melt. Steel	24.00
No. 1 Busheling	24.00
Nos. 1 & 2 Bundles	22.00
No. 3 Bundles	22.00
Machine Shop Turnings	14.50
Mixed Borings, Turnings	14.50
Punchings & Plate Scrap	24.50
Cut Structurals	24.50

Cast Iron Grades

No. 1 Cupola Cast	27.50
Charging Box Cast	22.50
Heavy Breakable Cast.	21.50
Stove Plate	23.00
Unstripped Motor Blocks	21.50
Malleable	27.50
Brake Shoes	27.50
Clean Auto Cast	27.50
No. 1 Wheels	24.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Railroad Malleable	30.00
Rails, Random Lengths	21.50
Angles and Splice Bars	23.00

LOS ANGELES

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	25.00
Nos. 1 & 2 Bundles	25.00
Machine Shop Turnings	16.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles.	28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00

Sheets, Strip . . .

No easing in pressure for deliveries anticipated for months to come

Sheet Prices, Page 148

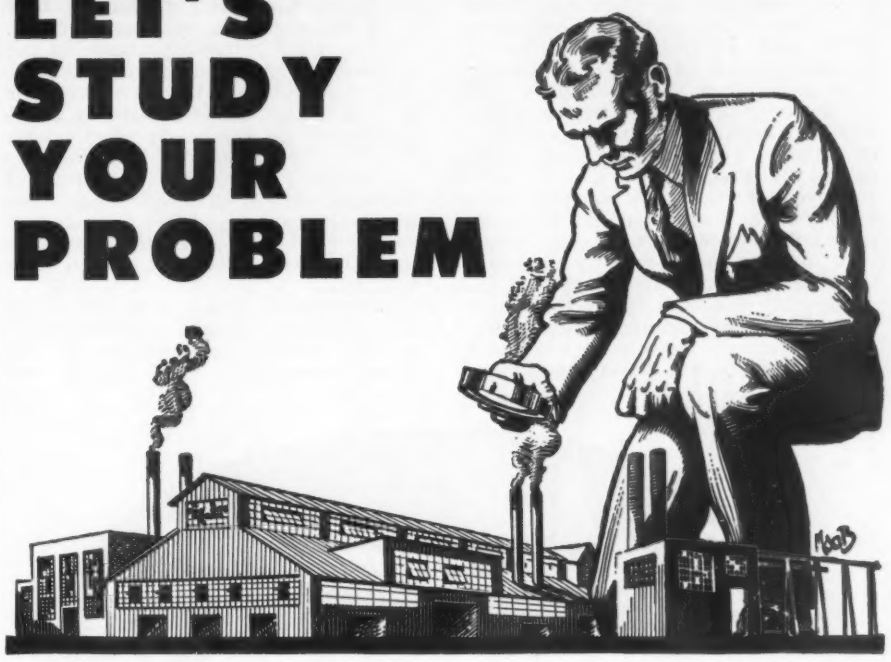
Pittsburgh — Despite record-breaking production throughout October and to date this month, it is improbable much, if any, headway can be made against substantial mill carryover tonnage in sheets and strip without reducing customers' allotments this quarter. Some sellers are "blocking" out December and part of January rolling schedules for this purpose. No easing in pressure for deliveries is anticipated for months to come, with supply not expected to be in balance with demand until well in 1948 at the earliest. However, if the Marshall Plan, as finally formulated, does not result in too excessive a drain on available supply of semi-finished steel, most sellers believe present tight supply in sheets and strip will gradually ease throughout next year, reflecting installation of additional cold-reduction mills and speed up programs. In contrast to other stainless steel items, demand for stainless strip has held up fairly well.

The Jones & Laughlin Steel Corp.'s blast furnace relining program (involving five furnaces over an 18-month period) is expected to result in a monthly loss of 15,000 to 20,000 tons of finished steel production. The loss of raw steel output is expected to be offset in part by greater production efficiency and purchase of ingots for conversion. Finished steel production loss resulting from the program is not expected to be divided evenly among various products produced; rather the distribution of this tonnage deficit will be based on extent of product demand and on limitations of finishing mill facilities.

Boston — Narrow cold-rolled strip capacity is filled for the first quarter with converters concerned as to availability of hot-rolled strip to match schedules. Most users are taking up full allocations for the period, but there are scattered exceptions, including one large supplier of metal findings for the shoe industry. On the whole, more consumers are balancing out inventories to better degree and are adjusting buying to 60 to 90 days. This is too short a lead time for most mills, considering current backlogs and carryovers. The latter will range up to one month's production at yearend. Demand for cold strip holds at high levels with some improvement in alloys. Chain makers using strip are maintaining specifications. Overall sheet supply is as critical as at any time with first quarter allocations sharply lower in most instances due to heavy carryovers.

New York — Sheet deliveries are being fairly well sustained, but in a volume far short of demands. This is particularly true of hot and cold rolled sheets and galvanized and no improvement is in early prospect. Notwithstanding the expansion now under way at the mills, most trade observers expect little improvement before the second quarter of next year and even then expect require-

LET'S STUDY YOUR PROBLEM



Is it a New Plant?

Is it Modernization?

Is it Increased Capacity?

Is it Materials Handling?

Is it Processing?

Is it Power?

SHREVE, ANDERSON AND WALKER
Engineers and Architects
DETROIT 26, MICHIGAN

ments to run well in excess of supply for some months after that. There is a little improvement in enameling stock and silicon sheets, although demand is still in excess of supply. Only in stainless steel and a few specialties does there appear to be a fair balance, although certain producers of stainless are unable to make shipments under eight weeks.

Cleveland — With no near-term easing in the heavy demand for light-gage, flat-rolled carbon steel products in view, one company in determining allotments for January is analyzing every account from the standpoint of its present and future value. Among factors considered are near-term profit to be derived from the account, and in connection with that, the amount of freight charges that must be absorbed by the producer. Also weighed is the importance of the account in the producer's future business. Adding to the necessity for such a policy is the failure of sheet production to reach expected levels, resulting in a carryover into January of unfilled 1947 orders. Continual personal visits and telephone calls to steel company sales offices are evidence of the continued pressure for light-gage, flat-rolled carbon steel products.

Cincinnati — Sheet mills are indefinite concerning first quarter allotments, pending completion of the schedules applying after Jan. 1. Preliminary work, however, indicates carryover will be close to that in the beginning of the current quarter, and also that allotments will not vary much from current tonnages. Meanwhile pressure for more flat-rolled steel is unrelaxed with all grades, excepting stainless, in the scarcity list.

Chicago—For most manufacturers of metal products, shortage of sheets and strip is the No. 1 brake on operations. It is the limiting influence in setting production schedules, although occasionally some of the deficiency is offset by substitution of other metals, principally aluminum. A manufacturer of automobile accessories and radios who had his fourth quarter quota from one mill set back to first quarter, 1948, reports success in lining up new sources of supply for first quarter, getting on the books of two mills not serving him in the past. Gray market offerings are less numerous, although prices are higher than a year ago. Each week brings new instances of aluminum substitutions for steel, one of these being replacement of galvanized sheets in heating and ventilating installations.

St. Louis — Sheet and strip production continues to reduce order backlogs, although the clamor for mills to take forward orders is unabating. Granite City Steel Co., for example, has not accepted new business for nearly a year. It expects to make final rollings on plate and hot sheet orders by Feb. 15, after which production of those items will be terminated permanently. Bar, wire and pipe makers, such as Laclede Steel Co., have been rejecting all but emergency orders for several months. Granite City is scheduled to start operation of its new cold reduction mill Nov. 20, but it will not reach capacity before February, if then. This will permit opening of books by Dec. 1, with allocations being made on the basis of past performance and essentiality. Developing turbine troubles may delay the reopening somewhat.

Birmingham — Some bookings on first quarter sheets have been made here. Expectations are that there will be a somewhat larger aggregate available in the new year, but physical facts do not seem to bear out that expectation, since facilities are being operated at virtual capacity and current expansion programs are not expected to be completed before two years.

Tin Plate . . .

Tin Plate Prices, Page 149

Pittsburgh — Electrolytic tin plate specifications are exceptionally heavy this quarter, due in part to consumers' belief that some restrictions on the use of tin plate for certain applications, such as for dog food and coffee containers, may be imposed soon. There is still good prospect that the tight supply situation in tin and steel will ease in time next year to permit an increase in tin plate production schedules during the last half of the year. It is not considered probable that fourth quarter quotas and carryover tonnages can be shipped by the close of this year, despite current high production.

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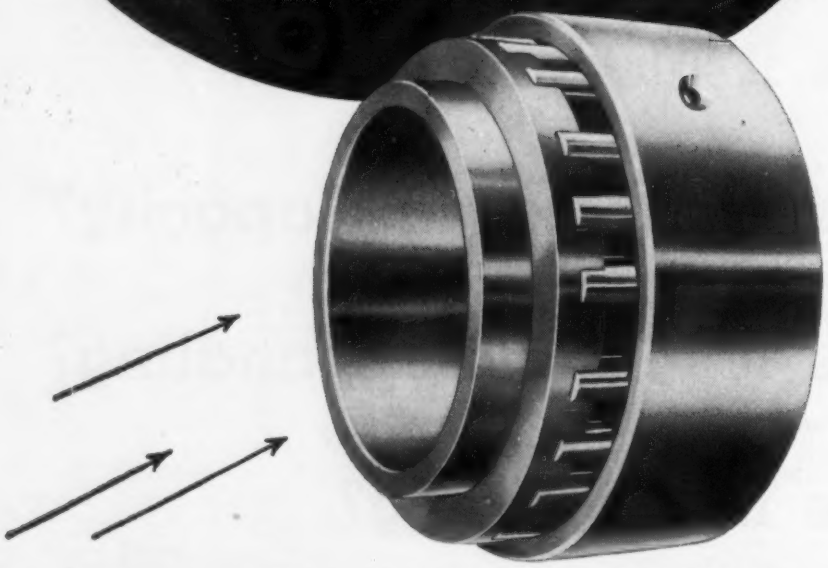

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Steel Bars . . .

Most producers cut customers' quotas in attempt to eliminate carryovers

Bar Prices, Page 148

New York — Several months of continued stringency in the small and medium sizes of hot carbon bars are indicated. Some mills have been able to set up slightly better quotas for the first quarter, but this appears to be offset by smaller quotas by other mills. Consumers requiring large rounds report an easier outlook but the principal demand is for small and medium sized bars. The situation in cold-finished carbon bars shows continued improvement, except in the small sizes. However, deliveries on these smaller sizes are better than in hot carbon. Some consumers assert they can obtain small sizes of cold-drawn carbon bars for shipment in mid-January and February. Alloy bars can be had within five to seven weeks, with cold alloys running a little longer in point of delivery than the hot.

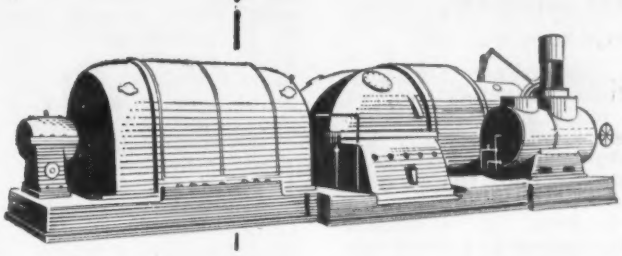
Boston — Carbon bar supply outlook improves slowly, but hot-rolled in smaller sizes and flats is still relatively tight. Some warehouses, however, are taking in more around 1/4-inch. Jobbers' stocks of carbon bars are in somewhat better balance. Slightly lower requirements of cold finishers have not materially eased hot-rolled schedules, other consumers taking up any volume released. Cold finished and alloys are in balance with demand except in a few small sizes, including flats.

Pittsburgh — Most bar producers hope to have practically all of their carryover tonnage cleared up by Feb. 1, barring unpredictable developments, such as fuel shortages, mill breakdowns, etc. To accomplish this, however, a substantial reduction will be necessary in customers' previously established allotments for December and January. In addition to the prospect of inadequate industrial gas supplies this winter, some producers' projected finishing mill production schedules are expected to be adversely affected due to necessity of extensive blast furnace relining programs.

Volume of new orders for hot-rolled alloy bars continues to improve, due in part to better balanced inventories in relation to projected production schedules among leading steel consumers.

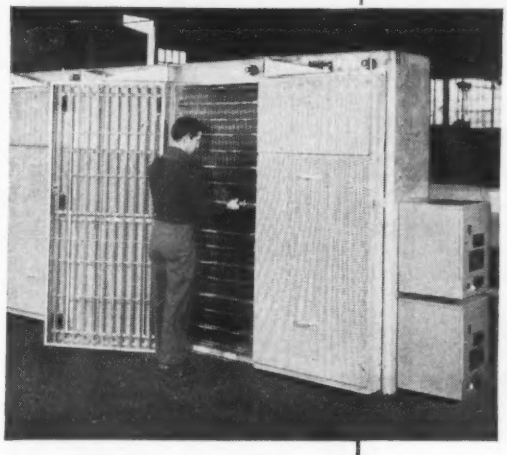
However, relatively prompt deliveries are still general throughout the industries, as is also the situation among cold finishers who also report some increase in receipts of new orders.

Cleveland — Demand for cold-finished carbon bars is reported spotty and tapering off, with warehouses reporting their stocks of cold-finished carbon bars sufficient to meet most demands. However, pressure for delivery of hot-rolled bars is undiminished. Sizes in greatest demand are 1 1/2-in. and under. Despite the heavy demand for hot-rolled carbon bars, some bar mills are running only part time because of insufficient semifinished steel.



Keep those motors cool AND CLEAN with FILTERED AIR

ONE element must not be overlooked when cooling mill motors by forced ventilation, if maximum operating efficiency is to be obtained. Drawn from high dust producing areas, this cooling air is laden with dirt. If not removed, it will soon permeate the motors and eventually lead to costly shutdowns and repairs.



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Structural Shapes . . .

Structural Prices, Page 149

Chicago — New inquiry for fabricated structural steel has dropped still further, but is not disturbing to structural shops which already are booked months ahead and are unable to obtain sufficient plain shapes from mills to keep work progressing as scheduled. Awards of structural steel also are running at a level considerably below that of earlier months this year. New orders exceed capacity and mills are able to offer no encouragement as to more generous supply to customers during the first six months of 1948.

Chicago city council is now studying draft of a proposed new building code, which, among other features, would permit prefabricated houses, hitherto prohibited. Instead of listing materials which may be used, the proposed code specifies performance standards, thus opening the market to the latest innovations in materials. Work on the draft required 13 months and cost $100,000.

New York — Structural inquiry is brisk with all indications pointing to an active spring season. Meanwhile, contracts are more numerous, with fabricating shops steadily extending their order backlogs. Several of the larger shops are booked ahead six to seven months.

Philadelphia — Structural steel demand is light in eastern Pennsylvania, with little business of size in prospect. Bulk of activity is comprised of bridge work, involving modest tonnages and principally for the state of Pennsylvania. An industrial project in prospect is an enameling shop for the Heintz Mfg. Co., Philadelphia, with the Austin Co., New York, engineer in charge. Shape supply is a little easier, with one producer offering more tonnage to regular customers for first quarter shipment.

Cleveland — Further use of welded steel construction in applications where castings formerly were used is adding to pressure for plates and structural products, widening the gap between demand and supply. Already, many construction projects are held back by difficulty of procuring structurals, and the demand would be even greater if building costs were not so high. However, considerable improvising is necessary to provide the necessary shapes for projects that are under way.

Washington — Philippine Republic has purchased 202 surplus bridges for nearly $1 million, War Assets Administration said last week. It was the first purchase by the Philippines under a $10 million credit recently extended by WAA.

The steel bridges, in unused condition, were designed for standard gage railroad tracks but may be converted to any gage or adapted for use as highway bridges. They were offered for sale in the United States several times, but no interest was developed.

The purchase included 165 spans of 70 feet and 37 spans of 123 feet. WAA said the 13,000-ton shipment was equivalent to 375 railroad carloads or about two and a half 5000-ton ships.

Birmingham — Structural demand is fairly active, although the major portion of the district's construction is apartment housing which requires little or no shape tonnage. This accounts largely for the fact that shape demand continues spotty. Shortage of steel is hampering production of some fabricated items.

Seattle — Fabricating shops have order backlogs that will take several months to complete, but there is need for twice the amount of steel available. Allocations from mills are inadequate for the requirements of this area and deliveries are slow. Consequently, business beyond current inventories is not being accepted. Potential demand for fabricated materials is of large proportions and presages a long period of activity.

Tubular Goods . . .

Tubular Goods Prices, Page 149

Seattle—Cast iron pipe market is quiet, due to seasonal conditions and deferred deliveries. Renewed interest is expected about the first of the year as spring construction jobs get under way. Meanwhile agencies report slow deliveries of contracts placed months ago.

Steel pipe is making inroads into the cast iron field because of current conditions.

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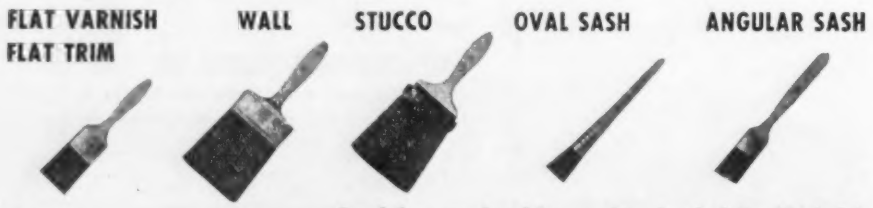

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Plates . . .

Some independents may lift prices due to higher costs. Raw materials remain short

Plate Prices, Page 149

Philadelphia — Confronted with continued shortage of raw materials, eastern plate mills are still having difficulty maintaining operations. Some are unable to even approach normal capacity operations. Meanwhile, little relief is in prospect with regard to raw material costs, which have been moved up substantially over the past several weeks, with a result that some independents are still weighing the matter of further advancing their prices.

The plate trade was interested last week in a reported offering of 150,000 tons of 72 x 108 inch plate through Gibson Export Co., Swarthmore, Pa., for delivery in November, December and January at a price of $70, fob shipping point, plus $2 for engineering and inspection services. Investigation revealed that the original amount was 90,000 tons and represented government termination material and that most of it now has been disposed of. The plates are SAE 1010 specification, ranging in thicknesses up to 1/2-inch, with some of this latter thickness still available. The material is for end-use consumers only. Among those interested in the disposal of this steel, in addition to the Gibson company, is Joseph Jacobson, 19 Upham St., Walden, Mass. In view of this offering it is interesting to note that the Navy is entering the market for substantial tonnages of plates for the first time since the end of the war.

New York Shipbuilding Co., Camden, N. J., has taken an order for the construction of two carfloats for the Erie railroad, requiring a total of 1800 tons of steel, principally plates. Western Maryland has awarded 1000 coal cars to Bethlehem Steel Co., Bethlehem, Pa.; also two diesel locomotives to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Boston — Stringency in plates is most critical in the more standard carbon grades, notably in the lighter range. Mill order backlogs are not being reduced to any extent and carryovers on carbon plates will be as heavy as at the start of the current quarter. Backlogs vary substantially, however, as some producers have been booking a minimum of this grade for months. On the other hand, floor plate deliveries are not too extended and some producers are active for clad tonnage. Warehouses are not getting odds-and-ends tonnage as formerly, and equipment for cutting to size is practically idle at some plants. Work has been resumed at several shipyards, down for months as result of strikes, but the type of work now in yards does not require the same ratio of plate tonnage as formerly.

New York — Pressure for plates has been further accelerated by the termination of the six-month strike at some of the local shipyards and at others along the eastern seaboard. Various shipyard requirements cannot be met, producers declare, because of their heavy order backlogs. The situation will remain stringent through the first quarter, as indicated by recent consumer quotas, and probably some months beyond. Producers continue to be greatly handicapped by shortage of raw materials, particularly pig iron.

Birmingham — Plate mill operations in this district are well sustained and some progress is being made in reducing order backlogs by restricting the booking of new orders. Car building continues to make heavy inroads upon available plate tonnage.

Seattle — Plates continue scarce and shop operators hesitate to take jobs involving large tonnages. The industry is busy with the usual run of tank and boiler work.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 148

Philadelphia — Reinforcing bar situation continues to be marked by a shortage of supply, although actual demand locally is less brisk than it was a few weeks ago. Principal work pending includes 250 tons for a plant addition for the Seaboard Container Corp., Bristol, Pa., on which McCloskey & Co., Philadelphia, are general contractors.

Chicago — Distributors of rein-

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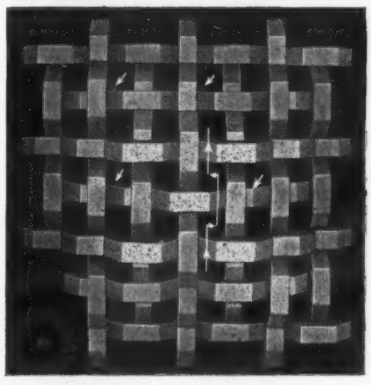
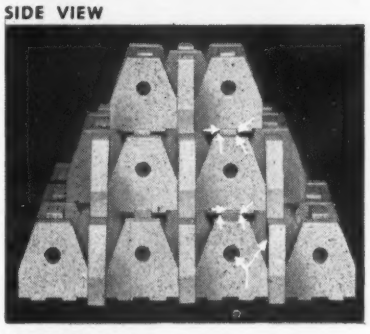
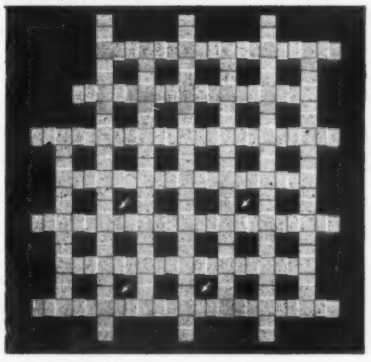
TOP VIEW



SIDE VIEW



BOTTOM VIEW



TOP VIEW Arrows show continuous flues:—square, open flues from top to bottom. May be used with or without tubular inserts. Cross-vents (indicated by line) give equalized heat and air over complete checker area, turbulence and high heat exchange.

SIDE VIEW Arrows show 4-Way lock: top and bottom—sideways in each direction. Lock is part of brick—expands and contracts with brick—cannot unlock, twist or spiral. Connected arrows show cross-vents.

BOTTOM VIEW Here again arrows show continuous flue with square open flue from top to bottom.

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forcing steel definitely are not interested in booking additional orders for the near future, except very small lots which can be fitted into current schedules. For that reason, invitations for bids on new projects attract only limited interest, and sometimes none at all. Mills are unable to promise more generous supplies of steel than have been furnished in recent months. The overall demand situation has been aggravated by the considerable number of public works jobs, such as federal, state and local bridge, paving and sewer projects.

Seattle — Heavy order backlogs that will carry well into next year are reported by rolling mills in this area. New business is not being sought because the first objective is to complete current contracts and expedite deliveries. Regular customers are given priorities, but in some instances contractors are finding difficulty in covering requirements.

Demand for merchant bars is unusually insistent, although bulk of the tonnage produced consists of reinforcing for which industrial construction and public works offer an enlarged market.

Wire . . .

Wire Prices, Page 149

Boston — Practically all users of manufacturers and other grades of wire are taking first quarter allocations in full. A few are leaving off some sizes and grades to balance inventories, but the overall volume assigned for the period is below demand. Most mills are now filled for first quarter with indication users of low carbon will be short of material in some cases. On some high carbon specialties, producers will end this quarter with about one month's production as a carryover and this has reduced quotas. Music wire in most sizes is on normal delivery basis.

Chicago — Manufacturers using wire rods in production of screw machine parts report shipments of this product reasonably satisfactory to maintain current output, although building of inventories is out of the question. On the other hand, wire producers, although operating at full capacity, are unable to keep abreast of demand, except in wire rope and electrical building wire. There is some evidence that requirements for telephone wire and steel strand may be coming into balance with production. On the other hand, heavy demand continues for most merchant products, including fencing, barbed wire, bales, ties and baling wire, and building nails.

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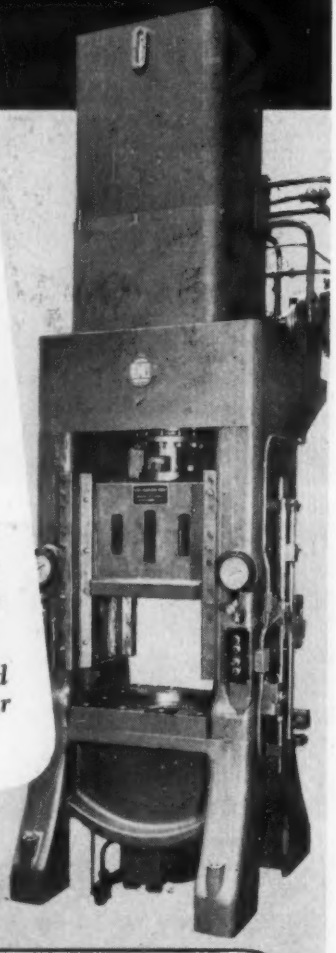

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Pig Iron . . .

Supplies continue to tighten, especially in eastern and Pittsburgh districts

Pig Iron Prices, Page 150

Philadelphia — Pig iron supply continued to tighten here, with foundries particularly hard hit. Virtual withdrawal of the Birdsboro, Pa., furnace from the general market as a result of its long-term agreement to ship about 90 per cent of its output to Lukens Steel Co., Coatesville, Pa., Worth Steel Co., Claymont, Del., and Warren Foundry & Pipe Corp., New York, is estimated in the trade to amount to a loss to district foundries of at least 4500 tons a month. The further withdrawal of southern iron accounts for an additional loss of 2500 tons.

In addition, the current suspension of the larger of the two Swedeland, Pa., furnaces accounts for a loss of 7000 tons or more of foundry iron, all of which under present conditions is seriously felt. Moreover, a foundry furnace at Bethlehem, Pa., is scheduled to go down for major repairs Nov. 17.

Further shrinkage in southern iron shipments is ascribed to a program of coke oven repairs at Woodward, Ala., beginning around the first of the year. However, the situation will be relieved next month by the scheduled return of the Swedeland furnace to operation. This will tighten coke supply in this district, but by that time most consumers will have a fairly good stock on hand, at least the customers of the Swedeland ovens, who have benefited by the diversion of coke when the blast furnace blew out for repairs around Oct. 1.

With the withdrawal of the Birdsboro furnace from the general market, the delivered Philadelphia price on low phos iron is $44.376, predicated on a $2.376 freight rate from Steelton, Pa. This price does not include the 3 per cent federal tax.

Boston — Melters of all grades of pig iron go into the winter months

with subnormal inventories. Outlook for any material improvement after the turn of the year is doubtful. While receipt of slightly more than 15,000 tons of foundry iron per month from the Everett furnace is reasonably assured, any increase in tonnage from Buffalo and other outside points is uncertain. Basic iron melters are generally operating with limited supplies. Demand for malleable iron tends to lengthen the Everett run on that grade. High ratio of scrap in melts continues and, while a few foundries have managed to raise the percentage of iron slightly, this has been impossible with many others, most lacking iron in volume to make this possible.

New York — District pig iron melt is tapering due to increasing difficulty of consumers in getting iron. Demand for castings is substantial enough, but foundries are unable to get sufficient iron to sustain operations. Some foundries are down for periods of several days and practically all are operating on a limited weekly schedule in one degree or another. Due to scarcity of pig iron, demand for scrap is heavier than ever, but there is a limit to which scrap can be used, to say nothing of the difficulty in actually getting all of the scrap desired.

Buffalo — District pig iron output rebounded to 94 per cent of capacity as the Hanna Furnace returned to capacity operations with the relighting of its fourth stack which was shut down about three months ago because of inadequate coke supplies. The production outlook is clouded with reports that leading producers will be forced to pare operations shortly as furnaces will be forced to undergo repairs after extended operating periods. Foundries continue to press for additional shipments. Increased demands are noted from heating equipment manufacturers.

Pittsburgh — Despite every effort to keep badly overworked blast furnaces in operation to meet unprecedented demand, Jones & Laughlin Steel Corp. has been forced to start an extensive blast furnace relining program which will involve three furnaces at Pittsburgh and one each at Aliquippa and Cleveland. The entire program will be extended over a period of 18 months and includes the rebuilding of larger hearths in at least one instance.

Company officials expect this program will result in loss of 15,000 to 20,000 tons of finished steel monthly, although increased production efficiency in purchase of ingots for conversion is expected to partially offset the loss in pig iron production.

Some relief from the critical pig iron shortage next year is expected by foundries here, if present plan of the Pittsburgh Steel Co. materializes. This company is hopeful final approval will be granted on its bid for the government-owned 1200-ton blast furnace at Monessen, Pa. This furnace was 95 per cent completed before construction was stopped toward the close of hostilities.

Scarcity and high price of scrap continue to force integrated steel producers to use maximum amount of pig iron in open hearths, with result that the normal tonnage channeled to the foundry trade has been reduced substantially.

Cleveland — Shortage of merchant pig iron was intensified with the blowing out last week for repairs one of two stacks of the Central Furnaces group here of the American Steel & Wire Co., United States Steel Corp. subsidiary. The work, now under way, will consist of repairs to the top and inwall. Because of the heavy demand for merchant iron the work has been classified as a rush job, which company hopes to have completed in two weeks. Capacity of the furnace is about 800 tons daily.

Price of basic pig iron in the week ended Nov. 16 remained unchanged from the preceding week, $35.50 fob furnace Cleveland, with one producer that pegs its price to price of heavy melting steel scrap quoting $40.75.

Cincinnati — Pig iron allotments for the remainder of the year are expected to hold close to recent levels. Realization of the short supply has taken some of the pressure off furnace interests who are now beset by appeals for quicker deliveries. The melt, as was the case for many weeks, is keyed to tonnage of pig iron available. Capacity operations are impossible despite heavy recourse to scrap.

Chicago — Of the 42 blast furnaces in this district, 41 continue to operate, producing iron at the highest rate in history. Bulk of the output, however, is hot metal for steelmaking use, leaving only a limited tonnage for merchant use. Pig iron available for sale to foundries is considerably below requirements, and a

THE two Multiple Unit Electric Combustion Tube Furnaces illustrated are among the modern electrical equipment in the new experimental station of one of the country's largest chemical manufacturers. They are being used in connection with research of resin and synthetic organic chemicals. Multiple Unit Laboratory Furnaces are generally used where industrial research is being conducted and are standard in most laboratories.

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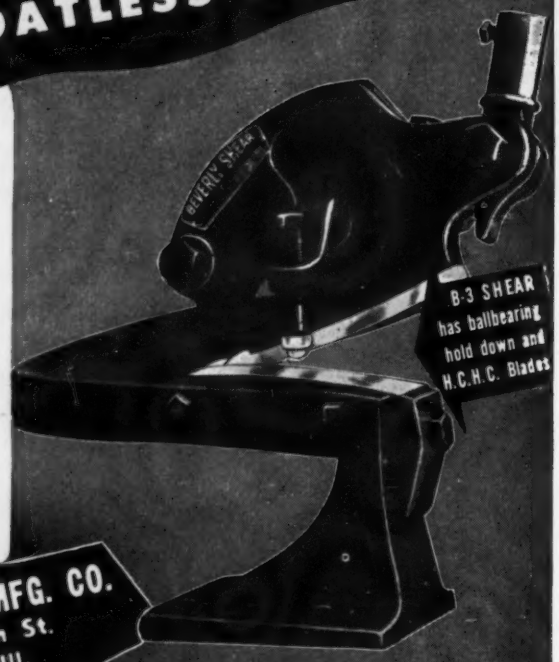

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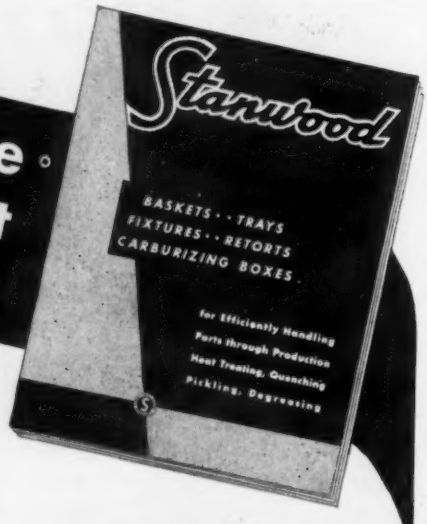

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worsening rather than bettering can be expected. It is obvious that steelmaking rate will hold near capacity through the winter and with scrap scarce the preponderance of blast furnace production necessarily will go into hot metal. One steelmaker expects to take out a furnace for repairs late in December and will devote all its capacity to basic iron, cutting off present output of merchant iron. A merchant iron maker probably will be forced to suspend a stack soon for repairs. Thus, future outlook for foundry iron is not good.

St. Louis — Supply of pig iron from outside this area is tightening and local production is insufficient to afford any relief. Buyers from outside sources had hoped their allocations could be increased during the fourth or first quarters but that hope is fading. Koppers production holds steady at 1000 tons daily. Its customers could use up to 20 per cent more iron were it available. They have reported no curtailment because of the scarcity, however. Coke supplies are becoming ever tighter but have not interfered with iron output locally.

Birmingham — Many of the Birmingham district's industries are still unable to get anywhere near enough to meet requirements. So acute is the iron shortage that civic interests are diverting attention to nonmetal industries in an effort to build up the district's production diversification. There is slight prospect of any better situation in the foreseeable future.

Seattle—While foundry operations have slowed, the scarcity of pig iron in this area has firmed cast iron scrap prices. Supplies are insufficient for present demands. Buyers have been trying to hold the price level at $27.50 for No. 1 cupola cast but it is expected to advance soon to $30, fob plant. Pig iron is hard to get as Utah producers are shipping sparingly to this area. One large foundry reports the first car of pig received in a month.

Iron Ore . . .

Iron Ore Prices, Page 150

Cleveland — Shipments of Lake Superior iron ore declined further last week, reaching the lowest level since the first two weeks of the season. The decline is attributed to adverse weather conditions. Shipments declined to 1,471,910 tons during the week ended Nov. 10 from 2,042,650 tons for the previous week and 2,063,158 tons for the like week a year ago, according to the Lake Superior Iron Ore Association. Shipments from United States ports totaled 1,455,658 tons, or an average daily loading of 207,665 tons, compared with 1,991,903 tons, or an average of 284,557 tons for the preceding week.

The cumulative total for the season to Nov. 10 came to 73,686,087 tons compared with 55,171,867 tons during the like period a year ago, including 72,098,046 tons and 53,956,293 tons, respectively, from United States ports. The cumulative total of 72,098,046 tons from United States ports showed an increase of 18,141,753 tons over the total for the like 1946 period.

Scrap . . .

Scrap Prices, Page 154

Cleveland — With the big steel companies refusing to pay more than $39.50, Cleveland, for No. 1 heavy melting steel scrap and with brokers striving to complete filling old higher-priced orders no new orders were being placed last week, although steel mills continued to procure customers' scrap under an earmarking procedure on the basis of $39.50. Desperate for scrap but at the same time opposed to paying runaway prices for it, big steel companies are pressing their customers to return scrap to them at $39.50.

It is hoped that such scrap return will prevent the development of a runaway market.

In filling old orders ranging from $43.00 to $49.50 delivered in the valley, brokers have been paying from $42.50 to $43.50 for local scrap and up to $47.00 for remote material. Most of the current old orders expire Nov. 22, and while brokers have completed most of these, one big consumer is reported to have issued notices that its old orders will be canceled as of Nov. 22 even though all tonnage under the contracts may not have been delivered and even though the consumer could well use the tonnage. This indicates that as of Nov. 22 there will be a determined effort to purchase at lower prices. How long such a policy can be followed is questionable with winter approaching and with steel mill inventories of scrap at low levels.

Considerable cross-hauling of scrap is interfering with car supply thus adding to current difficulties.

Pittsburgh — There is a growing belief among scrap market observers that heavy melting steel will be successfully stabilized at approximately the $40 level. Some small lot purchases at this price were reported last week, while a number of mills have informed their scrap sources that the higher priced unshipped tonnage commitments will be canceled at expiration of contracts. Some mills in this district were awarded the heavy melting steel tonnage on the New York Central, Erie, and Pittsburgh & Lake Erie railroad lists at $41, including broker's commission. This is considered significant for it perhaps indicates success on part of steel producers in their effort to stabilize heavy melting railroad scrap at the normal $1 differential over industrial open hearth grades.

Reflecting heavy influx of scrap shipments at the high price levels, some mills have been able to augment inventories. However, this is by no means general, for stocks are not evenly distributed between producing plants, with some interests reporting less than a two weeks' cushion. With winter season approaching, the scrap supply outlook appears to be just as critical as early this fall.

Philadelphia — Although the major open hearth grades of scrap held unchanged last week, undertone of the market is strong. There is a tendency among consumers to buy at present prices of $42 to $43, delivered, for melting steel, No. 1 bushel-

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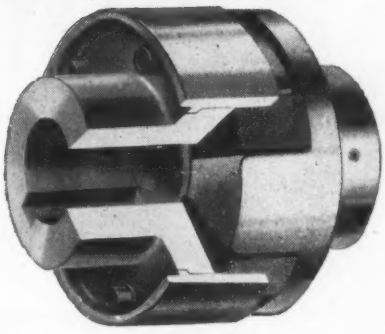

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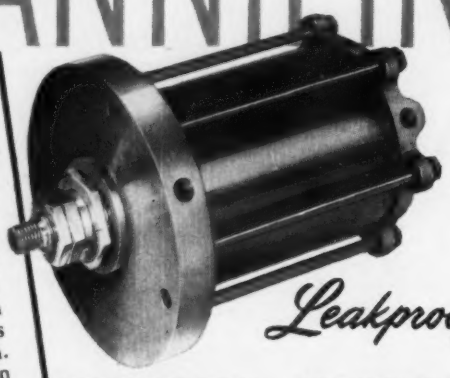

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Charles H. Lott, General Manager

ing and Nos. 1 and 2 bundles, but dealers and brokers are less disposed to book further tonnage at these levels, at least until they are more fully covered against contracts already accepted at these prices. As it now stands, a number of these sellers are having to cover at prices that leave little or no margin of profit, with some scattered lots being picked up at figures actually above the selling prices. Original sources of supply appear bullish, what with winter approaching, finished steel strong, pig iron supplies more stringent, and consumer inventories far from adequate under the circumstances. Strength is reflected in offerings on railroad lists and various industrial tonnages coming up. Present period of test may run for another week or ten days.

Low phos grades are actually higher, with bar crops and plate, punchings and plate scrap and cut structurals now holding at $47.50 to $48.50, delivered. Cupola cast is higher at $50 to $51, and machinery cast at $52 to $54. Clean auto cast also has been advanced to this latter range and No. 1 wheels to $50 to $51. Other cast grades are unchanged for the present, although sentiment is strong, with the true market in some items difficult to appraise.

New York—Brokers' buying prices on the major steelmaking grades advanced $1 a ton last week to $39, fob shipping point. Other increases include an advance of $1 on No. 3 bundles to $37; on unstripped motor blocks, from $40 to a spread of $41 to $42. Both buyers and sellers are moving cautiously in a test period which may run another week or so.

Boston — As higher-priced contracts expire, heavy melting steel scrap prices tend to soften, although lack of buying makes the market uncertain. Against contracts, $35 to $36, fob shipping point, is being paid, but new orders are not being placed at that quotation. Volume of strictly No. 1 heavy melting steel is limited, both yard and industrial material. Considerable of the latter is not coming out in the open market. Slightly more tonnage is available from ship breaking, but this is costly scrap when the work is done by steel works.

Chicago — Test of scrap market here probably will not come until late this month or early December. Contracts placed at the $43 figure for heavy melting steel will expire about Nov. 22. Meanwhile mills are receiving only small tonnages of material at their current buying price of $39 a ton delivered. The market is strong, however. Inventories of mills are adequate for current requirements but whether they will be able to hold the price line when they again seek to buy extensively remains to be seen.

Buffalo — Scrap dealers term the present market here one of the "craziest" on record as leading mill consumers continue to hold the line against higher prices for steelmaking grades while outside buying is taking place at considerably higher levels than the local bids. Although top mills refuse to bid above $39.25 for No. 2 heavy melting, sales to Pittsburgh consumers in this area are reported on the basis of a $43.70 Buffalo price.

Dealers report that local mills have been warned that winter operations may be threatened as a substantial

quantity of scrap which usually moves to area consumers is now finding its way to outside consumers. Fresh sales of No. 1 heavy melting were reported within the range of $41.50 to $43.50.

Strength and rising prices were prevalent also in the market for turnings and cast scrap.

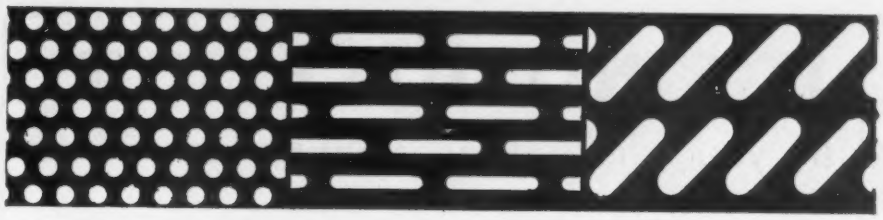
Detroit — Shipments on higher-priced orders will continue to be received until Nov. 22 and until that date prices will mark time pending clarification of the next movement. Mills are inclined to relax on shipment schedules and to permit overshipment, although they are increasingly critical of quality and make no bones about rejecting off-grade material. Contingent upon ability to obtain a sufficient supply of blast furnace metal, Great Lakes Steel Co. is readying plans to start its bessemer converter installation some time next month. Iron will be partially blown to what might be called "synthetic" scrap, then transferred to open hearths, permitting an appreciable reduction in heat time and a consequent improvement in the daily tonnage record. Scrap brokers here confirm the "wild" market in malleable cast grades, one sale being reported at close to the $70 per ton level.

Cincinnati — Activity in steelmaking grades of scrap was limited last week to fulfilling old orders. Brokers and dealers continued wary of new contracts at the hold-the-line quotations; hence, all interests appeared to be waiting developments. Some tonnage is undoubtedly being withheld on speculation. Demand for foundry grades is undimished.

St. Louis — The scrap market in this district holds relatively steady, with a few old orders being filled at higher than current prices. Shipments are moderately better and there are reports of supplies coming from some new sources under the stimulus of price decline fears. However, most brokers anticipate steady prices for a time, although admitting likelihood of a tight winter. Prices here do not fluctuate as sharply as elsewhere since there are fewer mills to bid on short supplies. Mills' reserves are improving, one reporting a 90-day stockpile, while the average is 30 to 40 days. The foundry average is 30 days or better. Offerings of railroad scrap are disappointingly small.

Birmingham — Scrap prices definitely have eased, although yards report they are considerably hampered by inclement weather in their preparation work. Shortages are more pronounced in heavy melting and cast grades.

Seattle — Mills' receipts of steel scrap are slightly in excess of consumption, but the margin is not sufficient to build inventories. The recent increase of $2 has stimulated shipments to some extent but with the advent of winter weather receipts may not continue at present levels. Mills are not anxious to build up large inventories at current prices but are seeking sufficient material to insure capacity operations. War Assets Administration plans to strip the eight shipways and assembly shop at Swan Island which are expected to yield 1,000 tons of scrap angles, channels and scaffolding and 400 tons of I-beams.



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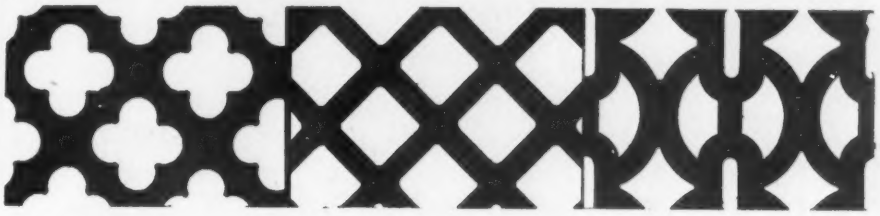

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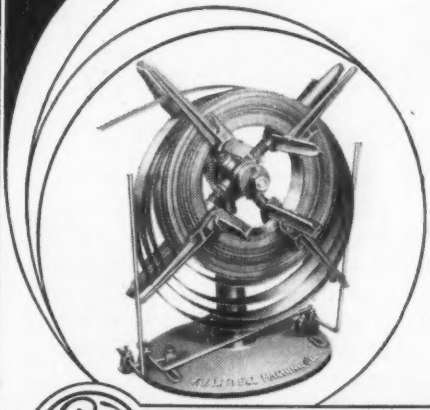

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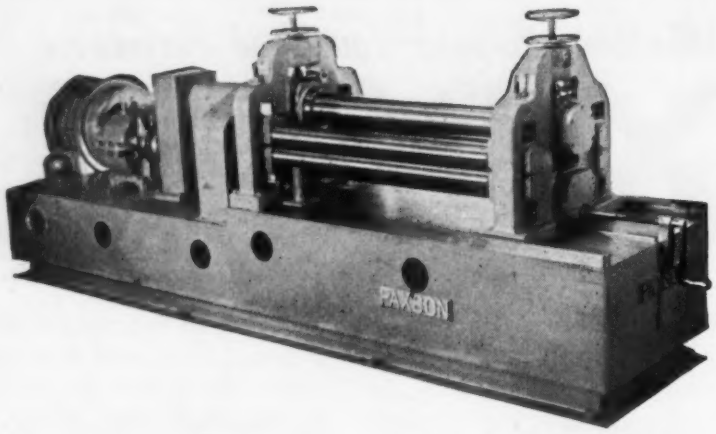

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Warehouse . . .

Warehouse Prices, Page 151

New York — While warehouse allocations for first quarter are leaner, the drop in shipments will not plumb the level of quotas; included in mill carryovers is considerable warehouse tonnage which will come in during that period. In any event, however, available tonnage will be far short of meeting consumer requirements for numerous products, notably sheets and plates. Structurals, standard pipe and nails are also short. Slight improvement in demand for alloys is noted, but most distributors, with substantial balanced stocks, could well handle additional volume.

Cincinnati — Active demand for steel from warehouses continues to find stocks of sheets, plates and shapes virtually exhausted. Pressure for flat-rolled items from fabricators appears heavier in the lack of satisfying tonnage from mills. Jobbers are allocating material as it arrives, not attempting to stock against anticipated tapering of mill shipments next month.

Seattle — Jobbing houses are issuing a new price list reflecting the recent freight increases, averaging 15 cents per hundredweight. The volume of business is outstanding, one firm reporting October the largest month in its history. Many large buyers unable to purchase in car lots from mills are turning to warehouses for their requirements. Government construction in Alaska and at Hanford is channeling a large amount of business through local warehouses.

Rails, Cars . . .

Track Material Prices, Page 149

New York — Domestic freight car awards in October of 17,737 were the largest since the war, according to the American Railway Car Institute, New York. Total exceeded the previous high of 15,236 in July of last year and compares with the September bookings of 9917. The total for the first ten months is 109,283. October deliveries totaled 8364 cars, with 6242 being delivered by commercial shops and 2122 by railroad company shops. Order backlogs as of Nov. 1 amounted to 125,623, with 93,448 for commercial shops and 32,175 for railroad shops.

Birmingham — Louisville & Nashville Railroad has placed an order for 76,000 tons of 132 pound rails with the Ensley mill of Tennessee Coal, Iron & Railroad Co. for delivery in 1948. The order, with accessories, is valued at approximately $6,700,000.

Apex Smelting Co. Acquires National Smelting Properties

Apex Smelting Co., Chicago, has purchased the plant, laboratories and equipment of the National Smelting Co., Cleveland, effective Jan. 2, 1948. National Smelting facilities will be operated as the Apex Smelting Co. Cleveland plant and will produce aluminum, magnesium, zinc base alloys and other related products. This will enable the company to render more efficient service to its present

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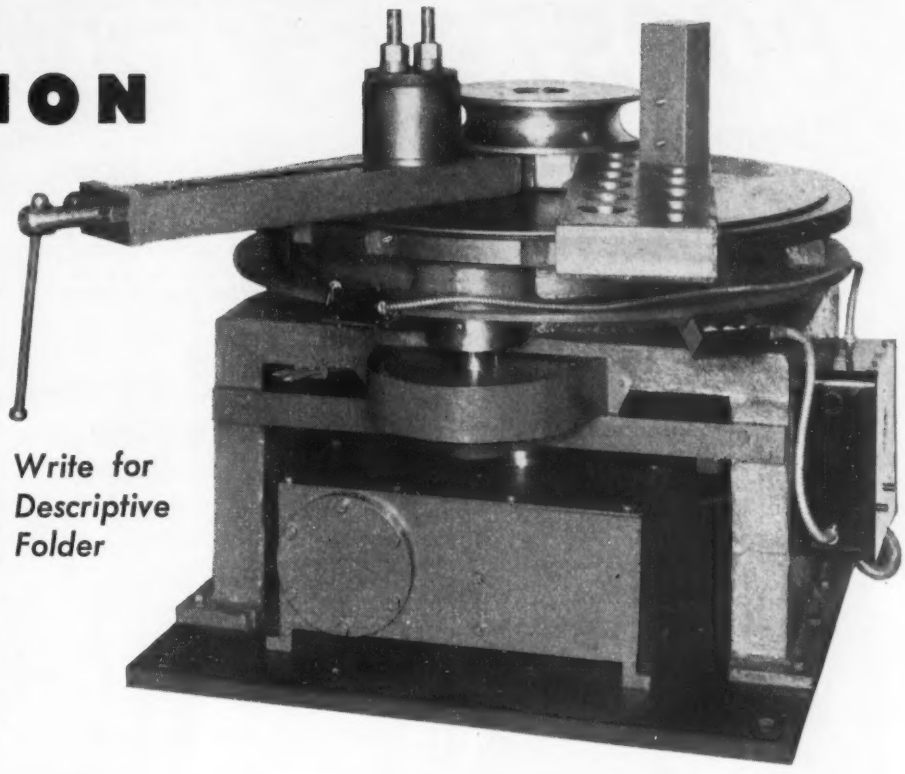

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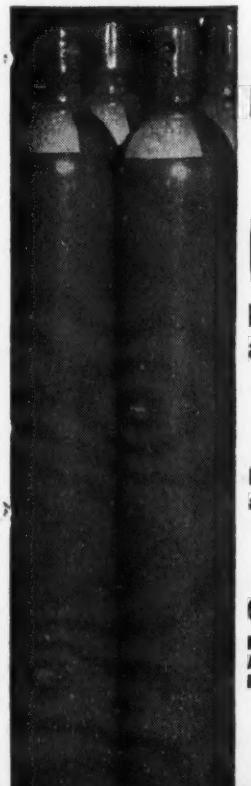

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and prospective eastern customers, according to W. A. Singer, president of Apex Smelting.

Mr. A. Rubin, vice president, National Smelting Co., will become an officer and director of Apex Smelting Co. and manager of the Cleveland plant.

Mr. Walter M. Weil, president, National Smelting Co., said that his company will continue operations until Jan. 1 to insure uninterrupted production and employment up to the time the new owner's operations begin.

Coke Becomes One of Steel Mills' Major Supply Problems

Youngstown — Shortages of raw materials and labor are hampering steel mill operations in this district. Mills are not too liberally supplied with scrap and are unable to increase their charges of pig iron since blast furnaces have been operating at top capacity for many weeks, although not at top efficiency due to the poor quality of coke available. Some open hearths are idle due to lack of material.

Coke has become one of the steel plants' major problems. One producer is reported losing 20 per cent of its possible iron production because of poor quality of coke. Other plants are losing from 6 to 8 per cent of possible peak production because of poor coke. Some companies have some unusual coke deals. One blast furnace operator is shipping to an industrial firm part of the iron produced from coke supplied by that firm. Another supplier of coke specifies that part of the iron produced must be used to make steel which subsequently is fabricated by another company into pipe for shipment to the original coke supplier.

Steel mill executives here are disturbed about proposals to send scrap and semifinished steel to Europe under the Marshall plan. Pointing out that the nation's steel plants already are short of scrap, they feel this might force still higher scrap prices and break down their efforts to prevent any further increases in steel prices. They point out also that they would lose about 10 per cent scrap return on the semifinished steel.

The program of shipping ingots to Great Britain during World War II, involving scrap losses of 25 to 35 per cent, helped to deplete the nation's scrap supply in recent years. Some authorities here think it would be better to supply only finished goods.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2100 tons, new plant unit No. 3, Chicago Screw Co., Bellwood, Ill., to American Bridge Co., Pittsburgh.

1300 tons, parts plant, International Harvester Co., St. Paul, to Gage Structural Steel Co., Chicago, for fabrication by Allied Structural Steel Cos.

1205 tons, New York Central station improvements, Toledo, O., through the Duffy Construction Co., to the Duffin Iron Co., Chicago.

1200 tons, wharf, American Sugar Refining Co., New Orleans, to Bethlehem Steel Co., Bethlehem, Pa.

705 tons, Public School No. 176, Queens, to Harris Structural Steel Co., New York.

700 tons, power house, Corn Products Refining Co., Argo, Ill., to Gage Structural Steel Co., Chicago, for fabrication by Allied Structural Steel Cos.; Sargent & Lundy, Chicago, engineers.

630 tons, Central of New Jersey railroad bridges, to Bethlehem Steel Co., Bethlehem, Pa.

534 tons, bearing piling, grease and lube plant, Pure Oil Co., Smith Bluff, Tex., to Carnegie-Illinois Steel Corp., Pittsburgh.

390 tons, addition to research building, Standard Oil Co. of Indiana, Whiting, Ind., to Joseph T. Ryerson & Son Inc., Chicago.

385 tons, candy factory, Mineola, Long Island, to Bethlehem Steel Co., Bethlehem, Pa.

316 tons, bridge S 268(3), Park county, Wyo., for state, to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

270 tons, Brownsville Health Center, Brooklyn, to Dreier Structural Steel Co. Inc., Long Island City, N. Y.

250 tons, third unit, Ross dam, for Seattle city light department, to Pacific Car & Foundry Co., Seattle; General Construction Co., general contract.

230 tons, market building, S. S. Eustis Co., Cambridge, Mass., to West End Iron Works, Cambridge; White Construction Co., Boston, general contractor.

210 tons, apartment, Grand Concourse, Bronx, N. Y., to Grand Iron Works, that city.

180 tons, municipal bridge, Seventh St., Philadelphia, to American Bridge Co., Pittsburgh.

170 tons, lead dross building, American Smelting & Refining Co., Hammond, Ind., to Reuter Bros. Iron Works Inc., Chicago; Sugarman-Moore Co., Chicago, contractor.

160 tons, state bridge, Bedford county, Pennsylvania, to American Bridge Co., Pittsburgh.

155 tons, New York Central terminal, New York, to Bethlehem Steel Co., Bethlehem, Pa.

153 tons, factory building, Florence Stove Co., Kankakee, Ill., to Bethlehem Steel Co., Bethlehem, Pa.; Campbell-Lowrie-Lautermilch Corp., Chicago, contractor.

152 tons, bridge No. 764(2), Jasper county, Iowa, for state, to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

150 tons, state bridge, Lycoming county, Pennsylvania, to American Bridge Co., Pittsburgh.

145 tons, addition, Jewish Hospital, New Haven, Conn., to the Kramer Iron Works, that city.

130 tons, plant addition, A. C. Gilbert, New Haven, Conn., to Belmont Iron Works, Eddystone, Pa.

100 tons, shop alterations, Consolidated Edison Co., New York City, to American Bridge Co., Pittsburgh.

STRUCTURAL STEEL PENDING

500 tons, fabricating plant, Chicago Bridge & Iron Co., Salt Lake City, Utah.

500 tons, mill building, Continental Steel Co., Kokomo, Ind.; bids Oct. 30.

175 tons, general storage building, Standard Oil Co. of Indiana, Whiting, Ind.

REINFORCING BARS . . .

REINFORCING BARS PLACED

200 tons, paving, Marshall county, Iowa, for state, to Des Moines Steel Co., Des Moines, Iowa; Atkinson Paving Co., Chillicothe, Mo., contractor.

110 tons, municipal power plant, Peabody, Mass., to Truscon Steel Co., Boston; M. Spinelli & Sons, Inc., Boston, general contractor.

100 tons, Puget Sound News Co. building, etc., Seattle, to Bethlehem Pacific Steel Corp., Seattle; Mowat Construction Co., general contract.

REINFORCING BARS PENDING

4564 tons, South Side intercepting sewer, Cont.

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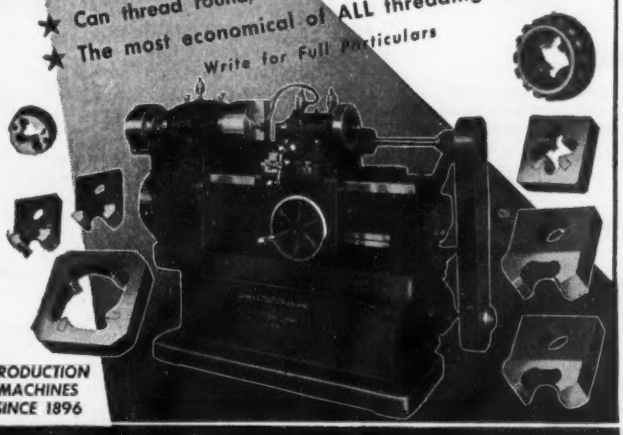

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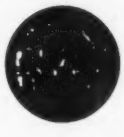

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3 and 4, Sanitary District of Chicago; general contract to S. A. Healy Co. and Peter Kiewit Sons Co., Chicago, jointly; bids Oct. 25.

260 tons, New Jersey state highway bridge; bids Nov. 19.

250 tons, plant addition, Seaboard Container Corp., Bristol, Pa.; McCloskey & Co., Philadelphia, general contractors.

240 tons, state bridge, Lancaster county, Pennsylvania; bids Nov. 21.

130 tons, Dearborn St. subway, Cont. T-9B, Department of Subways and Superhighways, Chicago; bids Nov. 13.

105 tons, laboratory, Minnesota State Highway Commission, Minneapolis; Steenberg Construction Co., St. Paul, low on general contract; bids substantially over estimate.

100 tons, state bridge, Dauphin county, Pennsylvania; bids Nov. 21.

100 tons, shapes for miscellaneous bridge repairs, Lawrence county, Pennsylvania; bids Nov. 21.

PLATES . . .

PLATES PLACED

1200 tons, 48 inch pipe, awarded through a Jersey City, N. J., contracting company to Alco Products Co., New York.

180 tons, plate rings, Condenser Services & Engineering Co., Edgemoore, Del., through Bethlehem Steel Co., Bethlehem, Pa.

PLATES PENDING

1800 tons, including some tonnage other than plates, two carfloats for Erie railroad, New York Shipbuilding Co., Camden, N. J.

100 tons or more, replacements for Seattle's Cedar river supply line; American Pipe & Construction Co., Portland, low, $38,969.

PIPE . . .

STEEL PIPE PLACED

33,000 tons, East Bay Municipal Utility District, Oakland, Calif., to Western Pipe & Steel Co. of California, San Francisco.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Lehigh & New England, 11 diesel-electric locomotives, to American Locomotive Co., New York; list comprises ten 1500-horsepower freight locomotives and one 1000-horsepower switching locomotive.

Lehigh Valley, seven 2-unit 4000-horsepower diesel-electric locomotives, to American Locomotive Co., New York.

Western Maryland, two diesel locomotives, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

RAILROAD CARS PLACED

Atchison, Topeka & Santa Fe, 2050 freight cars, placed as follows: 750 seventy-ton gondolas, 250 seventy-ton ballast and 200 seventy-ton hopper cars to American Car & Foundry Co., New York; 250 16,000-gallon tank cars and 200 seventy-ton covered hopper cars, to General American Transportation Corp., Chicago; 300 fifty-ton twin hopper cars to Pullman-Standard Car Mfg. Co., Chicago; 100 gondola cars to Pressed Steel Car Co., Pittsburgh.

Lake Superior & Ishpeming, 400 fifty-ton ore cars, to Bethlehem Steel Co., Bethlehem, Pa.

Wabash, 6 stainless steel passenger cars, to the Budd Co., Philadelphia.

RAILROAD CARS PENDING

New York, New Haven & Hartford, 46 new passenger cars, contemplated; it also plans to recondition 104 old cars. This program, including new equipment, will cost approximately $6 million and will go ahead if the railroad's application for fare increases, pending in four states, is granted.

RAILS PLACED

Louisville & Nashville, 76,000 pounds of 132-pound rails, to Tennessee Coal, Iron & Railroad Co.

CONSTRUCTION AND ENTERPRISE

CALIFORNIA

BELL, CALIF.—Crane Hoist Engineering Corp. has been formed with 1000 shares of no par value stock by William G. Mowat, 1236 N. Hill Ave., Pasadena.

EAST LOS ANGELES, CALIF.—Pacific Can Co., 290 Division St., San Francisco, has awarded a contract to Bechtel Corp., 3780 Wilshire Blvd., Los Angeles, for construction of a factory to cost $350,000.

FRESNO, CALIF.—Pacific Telephone & Telegraph Co. will build an office at Morca Ave. and Hampton Way to cost $600,000.

LOS ANGELES—Northrop Aircraft Inc. has been awarded a $1,500,000 contract by Boeing Aircraft Corp. for B-50 bomber landing flaps.

CONNECTICUT

NEW HAVEN, CONN.—Detroit Steel Corp., 1025 S. Oakwood St., Detroit, plans to build a $3 million plant on State St. Architect is Leo Carponi, 1221 Chapel St. Bethlehem Steel Co., Bethlehem, Pa., has steel contract.

ILLINOIS

CHICAGO—Glaesell Corp., c/o Madden & Connor, architects, 164 E. 154th St., Harvey, plans to build a $100,000 factory.

EVANSTON, ILL.—Rustoleum Mfg. Co., 2435 Oakton St., has awarded a $200,000 contract to C. W. Haynes Co., 135 S. LaSalle St., Chicago, for construction of a 3-story factory and 1-story warehouse.

FRANKLIN PARK, ILL.—H. G. Fischer & Co., 2323 W. Wabansia St., Chicago, has awarded a contract to Salde Construction Co. 1970 W. Balmoral St., for a 1-story factory and office building to cost about $100,000.

LINCOLNWOOD, ILL.—Federal Tool Co., 142 N. Leavitt St., has awarded a contract to Campbell-Lowrie-Lauttermilch, 400 W. Madison St., Chicago, for construction of a $750,000 factory and office.

MC COOK, ILL.—J. M. Huber Corp., 620 62nd St., Brooklyn, N. Y., has awarded a contract to Ragnar Benson Inc., 4744 W. Rice St., Chicago, for construction of a $800,000 factory.

ST. CHARLES, ILL.—Owens-Illinois Glass Co., Ohio Bldg., Toledo, O., has awarded a contract to Hughes Foulkrod Co., Schaff Bldg., Philadelphia, for construction of additions and alterations to its plant here, at a cost of $250,000.

INDIANA

INDIANAPOLIS—International Harvester Co. will build a $1,200,000 addition for expansion of truck engine operations.

ROCHESTER, IND.—Topps Mfg. Co., J. Elin, president, N. Main St., plans to build a 2-story, $100,000 factory addition. Architect is A. D. O'Keefe, 401 E. Jefferson St.

KANSAS

ULYSSES, KANS.—Cities Service Gas Co., First National Bank Bldg., Oklahoma City, Okla., contemplates a $2 million compressor station expansion.

MASSACHUSETTS

SPRINGFIELD, MASS.—Monsanto Chemical Co., Plastic Division, has broken ground for construction of a new unit to produce formaldehyde for expanded output of plastic resins.

MICHIGAN

DETROIT—Chrysler Corp., Amplex Division, has awarded a $250,000 contract to Couse & Westphal, 12740 Lyndon Ave., for construction of a factory.

DETROIT—Mechanical Handling Systems, 4601 Nancy Ave., will build a $100,000 factory addition. Plans are by Vogel & Fortney, 611 Park Ave.

RIVER ROUGE, MICH.—Ford Motor Co., 3000 Schaefer St., Dearborn, has awarded a contract to Arthur G. McKee Co., 2300 Chester Ave., Cleveland, for construction of a blast furnace, enlarging ore and raw material storage docks and miscellaneous work in a program to cost $18 million.

UBLY, MICH.—Thumb Electric Co-operative plans to undertake a $575,000 power plant expansion which includes a building addition and installation of two engines.

MISSOURI

ST. LOUIS—Andrew Schaeffer Co. plans construction of a $75,000 plant at Clarence and Natural Bridge Aves.

ST. LOUIS—Century Electric Co., 19th and Pine Sts., has awarded a $154,000 contract to Robert Paulus Construction Co., 3457 Morganford, for erection of a 3-story factory at 1326 Olive St.

ST. LOUIS — Missouri Portland Cement Co., Continental Bldg., has awarded contracts to H. A. Bailey Inc., 876 Hodiamont Ave., for a rock crushing plant and to Fruin-Colnon Contracting Co., 1706 Olive St., for a concrete clinker and lime storage building. This expansion and other improvements bring overall cost of the program to $2 million.

NEW YORK

BUFFALO—Hewitt-Robins Inc. has announced a $600,000 expansion program in its Rest-foam Division.

JAMESTOWN, N. Y. — J. P. Danielson Division of Plomb Tool Co. Inc. is erecting a 2-story addition which will add 24,000 sq ft of floor space.

LONG ISLAND CITY, N. Y.—Queens Industrial Center, Chatham Phoenix Bldg., will build a $5 million project to consist of 16 industrial buildings along 19th and 20th Aves. between 42nd and 48th Sts.

ORISKANY, N. Y.—Oriskany Malleable Iron Co. suffered damages estimated at almost $100,000 from fire recently.

OHIO

ASHTABULA, O.—Lake Shore Gas Co. is installing two more 30,000-gallon propane storage tanks at the company's West Ave. plant. Two already have been delivered and two more are expected in a $200,000 program for generating and production equipment.

ASHTABULA, O.—Mercury Equipment Co., subsidiary of War Products Co., 4710 State St., is constructing a boiler house addition and will install a heating system at a cost of $70,000.

CANTON, O.—Winters Foundry & Machine Co., which recently was incorporated with a capital of $150,000, will soon move to 4125 Mahoning Rd. N. E., where floor area will be tripled and a general modernization plan will be effected.

CELINA, O.—Reynolds & Reynolds, R. H. Grant, president, 800 Germantown St., Dayton, has awarded a $250,000 contract to Joseph Ulhenhake & Sons for construction of a factory.

CLEVELAND—Eaton Mfg. Co., 739 E. 140th St., plans to build a 1-story axle plant. Engineer is George S. Rider Co., Terminal Tower.

CLEVELAND—Uarco Co., 13300 Coit Rd., plans to build a $125,000 factory addition. Plans are by Bonfield & Cumming, 1900 Euclid Ave.

CLEVELAND—Jones & Laughlin Steel Corp., 3341 Jennings Rd., has awarded a contract to Paugh & Brown, 6014 Euclid Ave., for construction of foundations of an open hearth steel mill addition. Total cost of the project is estimated at $700,000. Engineer is Arthur G. McKee Co., 2300 Chester Ave.

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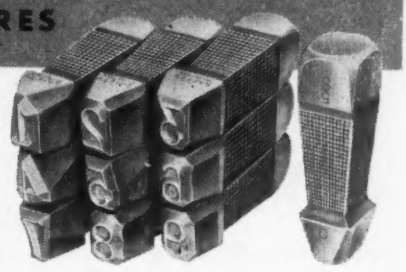

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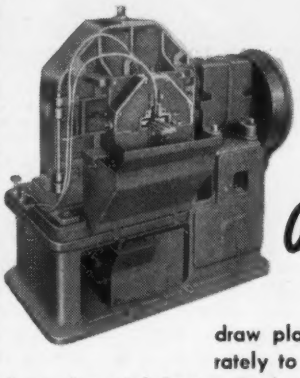

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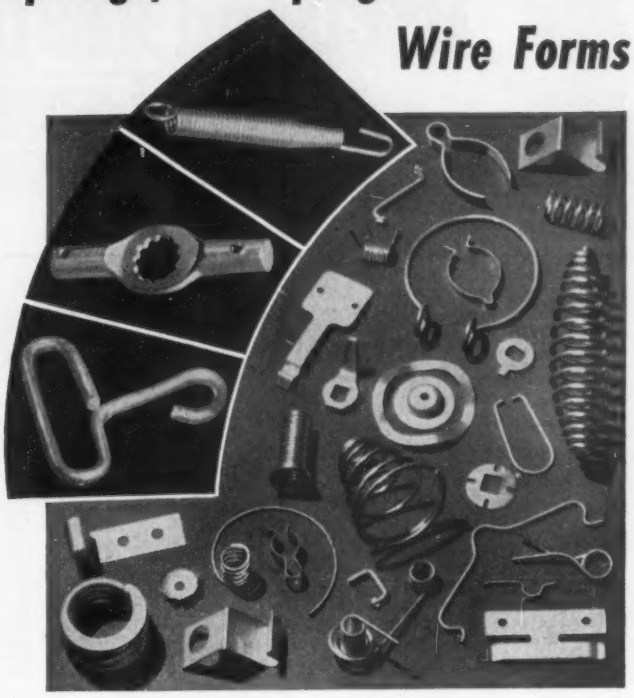

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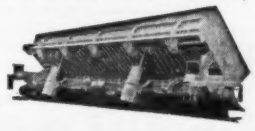

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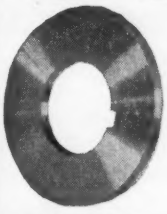

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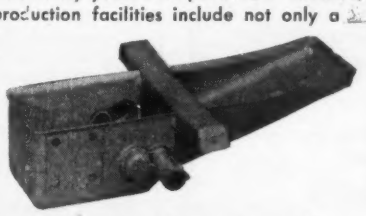

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Bids Wanted

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You are hereby notified that on the 3rd day of November, 1947, the undersigned, John Lewis Smith and Lawrence E. Duffey, Ancillary Receivers of Aerodynamic Research Corporation and The Hall Manufacturing Company, duly appointed and qualified in a certain cause numbered Civil 5789 pending in the United States District Court for the Northern District of Ohio, Western Division, entitled **United States of America and John Lewis Smith, Receiver of Aerodynamic Research Corporation, Plaintiffs, vs. Aerodynamic Research Corporation and The Hall Manufacturing Company, Defendants,** presented their petition to said Court for authority to sell certain assets and property of The Hall Manufacturing Company, Toledo, Ohio, specified in a bid dated September 19, 1947, submitted by Vickers, Incorporated, Waterbury Tool Division, Waterbury, Connecticut, to purchase the same, said bid being annexed to said petition, and reading in part as follows:

"1. We hereby offer to purchase, on the terms and subject to the conditions herein set forth, the following:

"(a) All the assets of Hall at the time of transfer of title to us (which must include those reflected in the preliminary balance sheet of Hall as of June 30, 1947, heretofore submitted to us, subject to increase or decrease in the assets, which we acquire, as a result of the ordinary and regular conduct of its business between June 30, 1947 and the time of transfer of title), including without limitation, inventory, fixed assets, automobiles, deferred items, goodwill, trademarks, the right to use the name 'Hall', rights to or under patents, insurance policies, and the right to have assigned to us Hall's rights under any or all unfilled orders; but not including cash on hand or in banks or notes receivable or accounts receivable at the time of transfer of title; and

"(b) All the interest of Aerodynamic Research Corporation in patents and (if we so elect) rights under patents previously owned or used by the corporation or division that formerly conducted the business now operated by Hall, which corporation, we believe, was an Ohio corporation using the name 'Hall'.

"2. We will pay for the assets which we desire to purchase and which are referred to in paragraph 1 above, when title thereto has been transferred to us and we have received possession thereof, the sum of $350,000, plus or minus the amount of any net increase or decrease, as the case may be, in the book amounts of such assets between June 30, 1947 (as shown by the balance sheet of Hall as of June 30, 1947, above referred to) and the time of transfer of title to us, as shown by an audit of the books and accounts of Hall by a firm of independent public accountants (on a basis consistent with that used in the preparation of the June 30, 1947 balance sheet) as of the time of such transfer of such title. It is understood that the $350,000 bid herein is allocated as follows: $125,000 to the land and buildings (hereinafter called the 'real property') and $225,000 to the balance of the assets which we desire to purchase and which are referred to in paragraph 1 above, such balance being hereinafter referred to as the 'personal property'. In the event that the transfer to us of title and possession of the personal property shall be made separately or at a different time from the transfer to us of title to the real property, the net increase or decrease referred to in the preceding sentence in the book value of such personal property shall be added to or subtracted from, as the case may be, the $225,000 amount allocated to such personal property and the $225,000 amount as so adjusted shall be the sum to be paid for such personal property, and the net increase or decrease, referred to in the preceding sentence, in the book value of the real property shall be added to or subtracted from, as the case may be, the amount of $125,000 allocated to such real property and the $125,000 amount as so adjusted shall be the sum to be paid for the real property. We will assume no liabilities of Hall or of Aerodynamic Research Corporation."

You are further notified that on the 4th day of November, 1947, said Court entered an order, finding and determining that a sale of said assets and property of The Hall Manufacturing Company free and clear of all liens and encumbrances was necessary; that the said bid of Vickers, Incorporated, Waterbury Tool Division therefor was the highest and best bid received to the date thereof by the undersigned Ancillary Receivers, and ordering

(a) that all persons interested in said property and assets or concerned with the sale thereof show cause at a hearing to be held before said Court at Room 204, United States Court House and Customs House, Toledo, Ohio, on November 26th, 1947, at 10 o'clock a.m., (EST) why said bid of Vickers, Incorporated, Waterbury Tool Division should not be accepted by the undersigned and sale of said property ordered in accordance with said bid;

(b) that this notice be given and published to the persons and in the manner stated therein;

(c) that any person desiring to submit a bid for said property and assets may present the same to the Ancillary Receivers, at 312 Summit Street, Toledo, Ohio, before the date of the hearing aforesaid, or to said Receivers at Room 204, United States Court House and Custom House, Toledo, Ohio at 9 o'clock A.M. (EST) on November 26, 1947, being one hour before the time of said hearing. Such bid shall be in the same form as that submitted by Vickers, Incorporated, Waterbury Tool Division, or, in a form containing terms and conditions deemed by the Court to be more advantageous to the interests of the receivership estate. Separate bids may be made by individuals, firms or corporations for all of the personal or all of the real property, provided, that any such bid must be in excess of the amount bid for such property by said Vickers, Incorporated, Waterbury Tool Division, and no bid for the personal property, will be considered or accepted unless such bid together with a bid for said real property exceeds by $12,500.00 the total bid heretofore made by said Vickers, Incorporated, Waterbury Tool Division. Provided further that no such bid shall be considered by said Receivers or by the Court unless the person, firm or corporation making the same shall deposit with the Ancillary Receivers a certified check in the amount of $25,000.00 securing the faithful performance thereof.

John Lewis Smith, Lawrence E. Duffey, Ancillary Receivers of Aerodynamic Research Corporation and The Hall Manufacturing Company.

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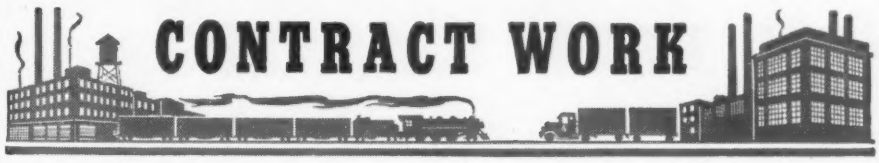

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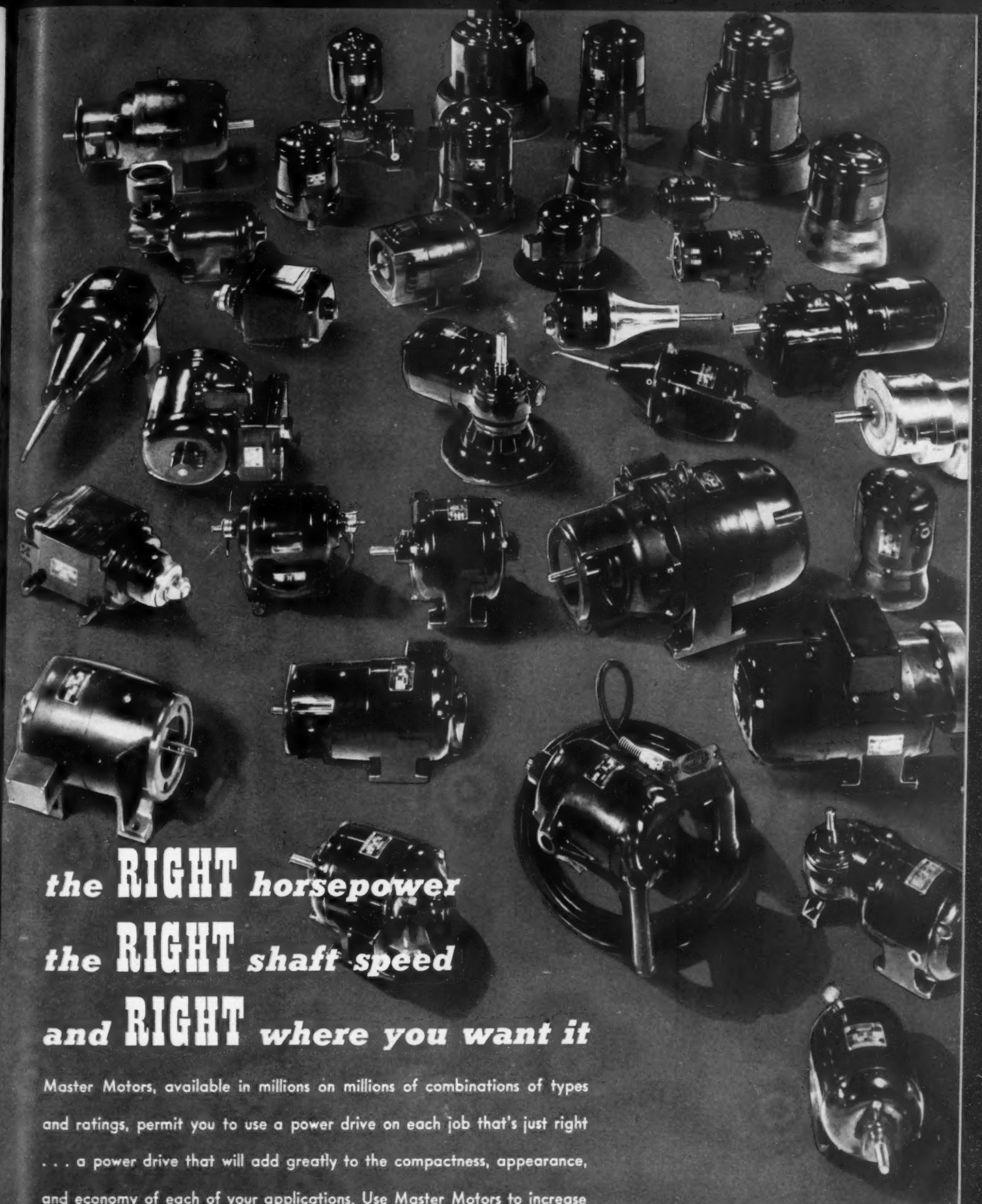

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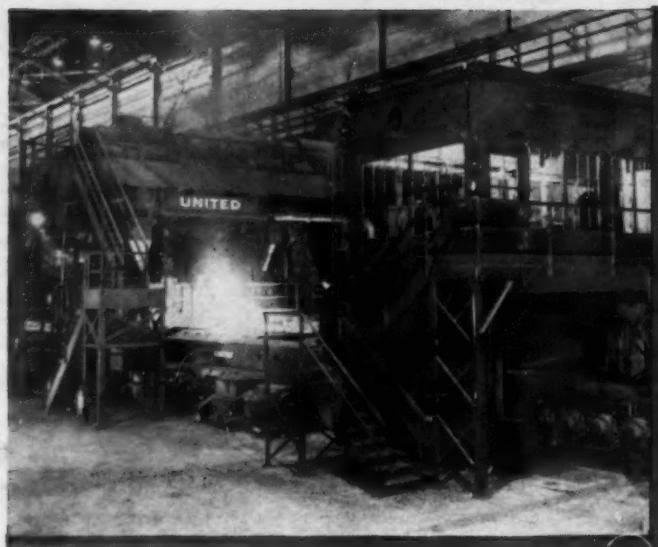
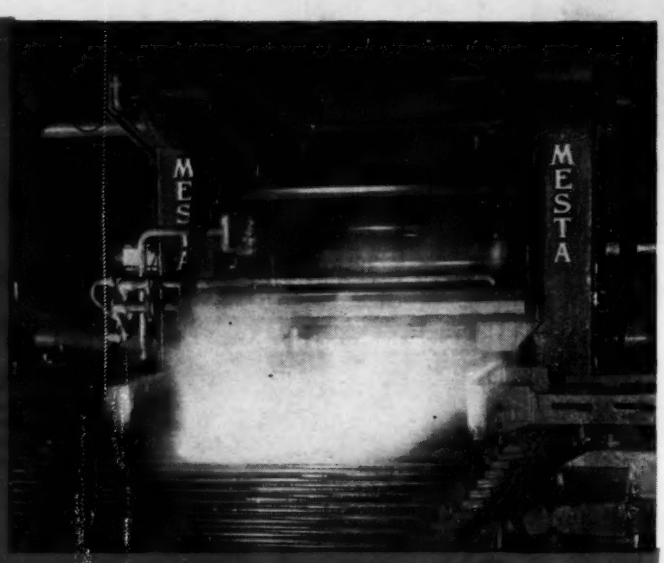


Two High 80" Slabbing Mill built by United Engineering and Foundry Company.



Four High 160" Plate Mill built by Mesta Machine Company.

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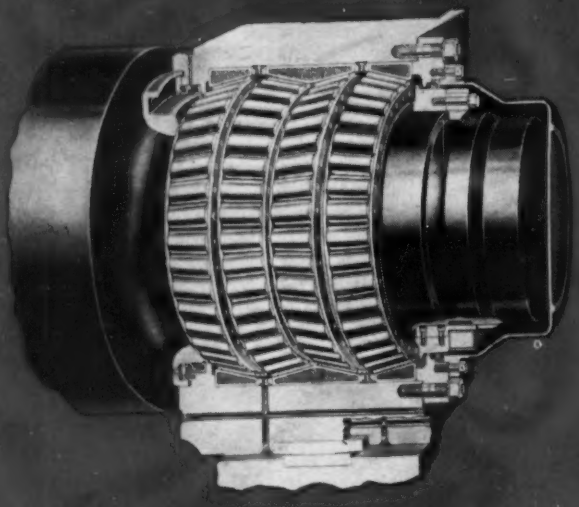

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